MAINE DEPARTMENT OF INLAND FISHERIES AND WILDLIFE

Chandler E. Woodcock, Commissioner

Wildlife Division
Research & Management Report
2011

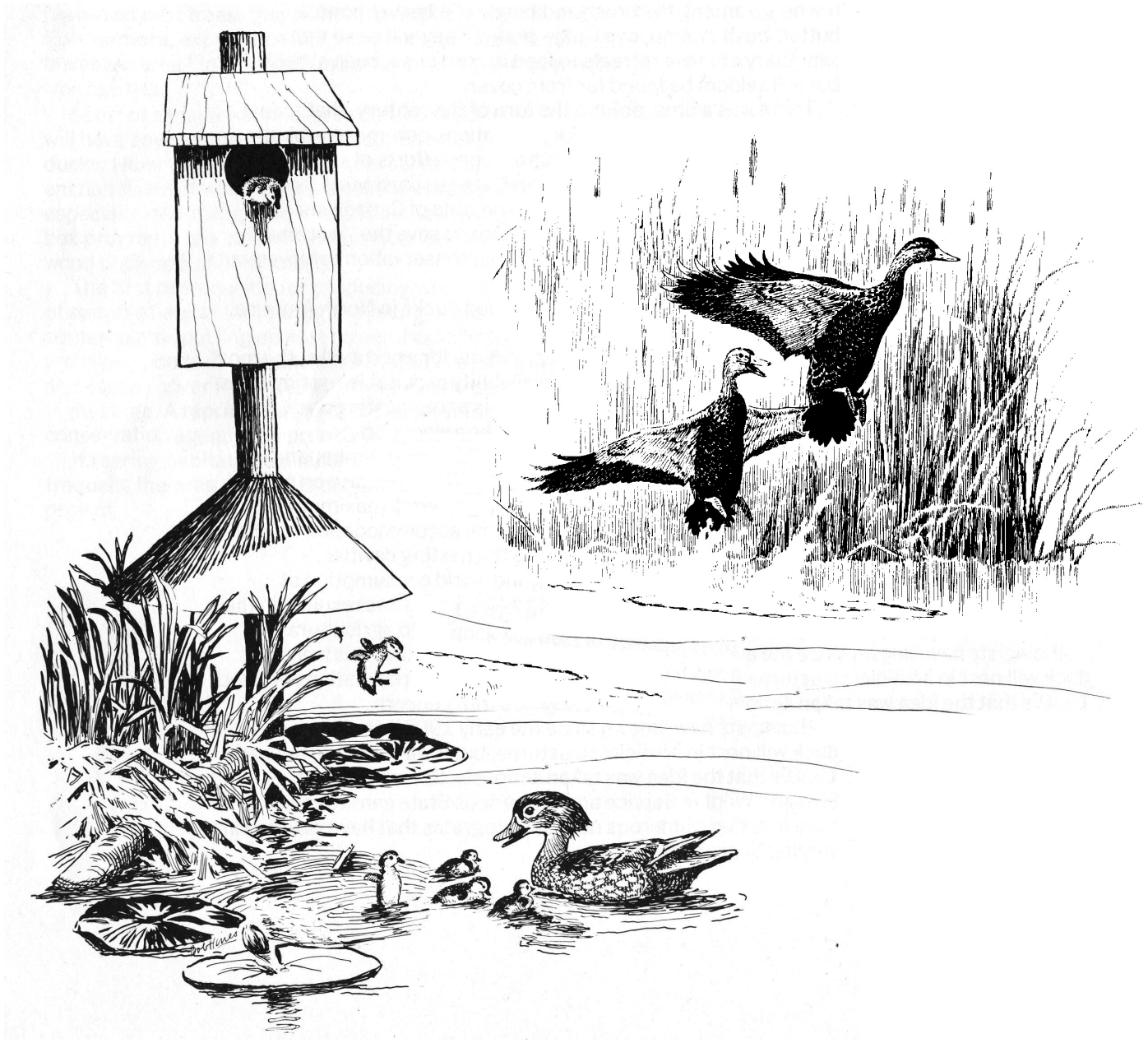


Table of Contents

DEPARTMENT FUNDING AND MAINE'S WILDLIFE DIVISION 3

FUNDING WILDLIFE AND HABITAT STEWARDSHIP 4

INTRODUCING THE SECTIONS OF THE WILDLIFE DIVISION 5
- Wildlife Resource Assessment Section 5
- Wildlife Management Section 6
- Wildlife Habitat Protection and Conservation 9
- Wildlife Habitat Group 11
- Wildlife Species Planning and Management 12
- Endangered and Threatened Species Conservation 13
- Bird Conservation and Management 14
  - 3rd Year of the Heron Observation Network 15
  - S.H.A.R.P. - The Saltmarsh Habitat and Avian Research Project 15
  - Game Birds 16
  - Raptors: Recent Population Highlights 17
  - Piping Plovers 18
  - Satellite Telemetry and Common Eiders in Maine 20
- Mammal Conservation and Management 21
  - White-tailed Deer 21
  - Moose 24
  - Black Bear 27
  - Canada Lynx 29
  - Furbearers and Small Game Mammals 30
  - White-Nose Syndrome in Bats 31
  - New England Cottontail 32
  - Wolves 33
  - Mammal Group Funding and Possibilities 33
- Reptile, Amphibian, and Invertebrate Conservation and Management 34
  - Amphibians and Reptiles 34
  - Invertebrates 37
  - Special Habitats for Reptiles, Amphibians, and Invertebrates 41

> "The last word in ignorance is the man who says of an animal or plant, "What good is it?" If the land mechanism as a whole is good, then every part is good, whether we understand it or not. If the biota, in the course of aeons, has built something we like but do not understand, then who but a fool would discard seemingly useless parts? To keep every cog and wheel is the first precaution of intelligent tinkering."
>
> — Aldo Leopold (Round River, 1953, published posthumously)

These studies are financed in part through Federal Aid in Wildlife Restoration Funds under Projects 81D, 82R, and 83C, and through the Endangered Species Conservation Act.

DEPARTMENT FUNDING AND MAINE'S WILDLIFE DIVISION

The most pressing need of the Maine Department of Inland Fisheries & Wildlife (MDIFW) is a stable and adequate source of funding for all of its programs. Fish-and-wildlife-related activities generate **$2.4 billion** in economic value for the people of Maine, yet State funding for the natural resource agencies has declined steadily over the last thirty years: comprising 4.3 percent of the state budget in 1981, 3.6 percent in 1990, 2.7 percent in 2000, 2.3 percent in 2006, and 1.8 percent today. Over the years, there have been several attempts to identify and create additional, long-term funding for the Maine Department of Inland Fisheries & Wildlife.

In 1999, the Legislature established the **Citizens Advisory Committee to Secure the Future of Maine's Wildlife and Fish**. In its 2001 report, the Committee concluded that the lack of funding to manage fish and wildlife resources adequately placed the continued existence of the State's outdoor recreation heritage and its rural economy in jeopardy for future generations. The committee recommended securing a significant source of broad-based funding for Maine's fish and wildlife conservation programs by dedicating at least 1/8 of one percent of the sales tax to the state agencies that administer those programs. [Several states, including Arkansas, Minnesota, and Missouri, have dedicated a portion of their sales tax to conservation.]

"...our environment and all the creatures that call our woods, waters and skies home....Maine's clean water, undeveloped areas, wildlife, and scenic beauty are important parts of our history, culture and hopefully, our future. The Maine Department of Inland Fisheries and Wildlife touches almost all natural resources that Maine people hold dear."
– Senator David Trahan

For the past two years, The Nature Conservancy, Maine Audubon, and the Sportsman's Alliance of Maine worked to advance the recommendation of the Citizens Advisory Committee. LD 563, sponsored by Senator David Trahan on behalf of these three organizations, was the mechanism to achieve this. LD 563 would create a Constitutional amendment allocating 1.2 percent of sales tax revenue to the Departments of Inland Fisheries and Wildlife and Marine Resources (DMR). DMR would receive 10 percent of allocated funds and MDIFW the rest. Maine citizens would have the opportunity to vote on the proposed amendment in the upcoming November election -- but there were several legislative hurdles that LD 563 had to clear to get to the voters.

LD 563 had to pass with a 2/3 majority in a series of five votes in the House and Senate before it would appear on the November ballet. It passed its "first reading" vote in both the Senate and the House. Next it went back to the Senate for the vote on "engrossment," where it again passed. From the Senate, LD 563 arrived back at the House. Senator Trahan, George Smith, The Nature Conservancy, Maine Audubon Society, The Natural Resources Council of Maine, Sportsman's Alliance of Maine, and others worked the House to garner the required 2/3 votes; and they were successful -- LD 563 cleared its second vote in the House. Anticipation was running high. After more than a decade of planning and hard work "in the trenches", LD 563 needed only one more 2/3 vote in the Senate for "enactment." The bill's sponsor and supporters turned their attention to talking with Senators to encourage a successful vote. All realized it was not a sure thing until the vote was in…and, on Tuesday, June 28, LD 563 failed to get the required 2/3 vote in the Senate, falling short by just two votes – a stunning and discouraging defeat after getting so close! The citizens of Maine would not have an opportunity to consider a referendum option to Secure the Future of Maine's Wildlife and Fish by approving the Constitutional amendment.

A public opinion poll conducted by The Nature Conservancy in 2009 found that 74 percent of Maine people are surprised that MDIFW receives little or none of their tax dollars; 64 percent of Maine citizens who were polled said they would specifically support the Constitutional amendment proposed in LD 563.

Wildlife Division staff had been excited about the possibility of additional funding for wildlife conservation. It, and the entire Department, greatly appreciates the efforts of Senator David Trahan, the bill's sponsor; George Smith; Tom Abello, The Nature Conservancy; Jen Gray, Maine Audubon; Matt Dunlap, SAM; Nick Bennett, The Natural Resources Council of Maine; Jeff Romano, Maine Coast Heritage Trust; Representative John Martin, Representative Mike Shaw, Senator John Patrick, and the members of the Legislature's Joint Standing Committee on Inland Fisheries and Wildlife.

And so, the *2011 Research & Management Report* is dedicated to a summary of last year's accomplishments and to a preview of new or enhanced wildlife management programs – developed with the latest science and with public participation – that could come on line if the Maine Dept. of Inland Fisheries & Wildlife were to receive a stable and adequate source of funding for its programs. Thank you for your interest, support, and participation in the conservation of Maine's wildlife. Here's to informative, and I trust, enjoyable reading!

-- G. Mark Stadler
Wildlife Division Director

FUNDING WILDLIFE AND HABITAT STEWARDSHIP

Many staff salaries and most of the administrative costs of the Wildlife Division's management programs for game animals and furbearers are funded by federal Pittman-Robertson Funds [FY11 $3,125,102]. Pittman-Robertson Funds are derived from an 11% excise tax on sporting arms, ammunition, and archery equipment, and a 10% excise tax on handguns. Pittman-Robertson Funds require state matching dollars, which come from a portion of the hunting license revenues [FY11 $1,513,444].

The Wildlife Division also receives federal funding for endangered species and nongame wildlife management in the form of State Wildlife Grants [SWG; FY11 $600,000] and so-called "Section 6" funds [FY11 $20,000] from the U.S. Fish and Wildlife Service for the recovery of threatened and endangered species or help recover a species before it becomes 'listed' under the Endangered Species Act.

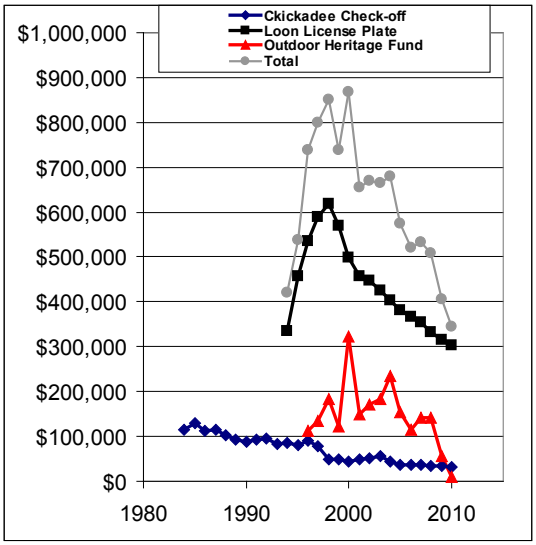
Contributions to the Nongame and Endangered Wildlife Fund ("Chickadee Check-off"), and purchases of Conservation License (Loon) Plates provide the core "State" funding for Maine's nongame and endangered species programs [FY11 $334,587]. All donated money is deposited into the Maine Endangered and Nongame Wildlife Fund - a special, interest-bearing account from which money can only be spent for the conservation of Maine's nongame wildlife that includes rare, threatened, or endangered species (Table 1). These funds can be used to match and spend the federal SWG funds.

The Maine Outdoor Heritage Fund, derived from the sale of conservation instant- scratch lottery tickets, can also provide an important source of "State" funding for Maine's wildlife conservation programs, largely for nongame and endangered species. The Division also receives funding from the Oil Spill Conveyance Fund [FY11 $132,664], which is used for oil spill preparedness and response.

Throughout the pages of the *2011 Research & Management Report* is a summary of last year's accomplishments with much help from our conservation partners. You will also find numerous projects described that could be done if the MDIFW were to receive a stable and adequate source of funding for its programs.

Table 1. A history of income derived from the "Chickadee Check-off," Loon Plate, and Maine Outdoor Heritage Fund to benefit wildlife programs.

	Chickadee Check-off				Loon License Plate		Maine Outdoor Heritage Fund	
Year	Total Given	Number of Givers	Average Donation	Percent of Taxpayers Giving	Income to MDIFW	Number of Registrations	Income to MDIFW	Number of Projects Funded
1984	$115,794	25,322	$4.57	5.3%				
1985	$129,122	29,200	$4.42	6.0%				
1986	$112,319	26,904	$4.17	5.4%				
1987	$114,353	26,554	$4.31	5.2%				
1988	$103,682	24,972	$4.15	4.8%				
1989	$93,803	20,322	$4.62	3.6%				
1990	$88,078	18,332	$4.80	3.2%				
1991	$92,632	19,247	$4.81	3.4%				
1992	$95,533	18,423	$5.18	3.2%				
1993	$82,842	15,943	$5.20	2.8%				
1994	$84,676	10,863	$7.79	2.0%	$335,042	59,829		
1995	$81,775	10,014	$8.17	1.8%	$457,307	81,662		
1996	$90,939	11,024	$8.25	2.0%	$535,679	95,657	$112,232	3
1997	$77,511	8,686	$8.92	1.5%	$588,364	105,065	$133,971	5
1998	$48,189	4,065	$11.85	0.7%	$617,484	110,265	$184,109	7
1999	$47,908	3,775	$12.69	0.7%	$569,610	101,716	$121,436	5
2000	$44,496	3,297	$13.50	0.6%	$499,486	89,194	$323,884	11
2001	$49,348	3,713	$13.29	0.6%	$458,057	81,796	$148,408	5
2002	$50,412	3,661	$13.77	0.6%	$446,342	79,704	$172,191	8
2003	$55,348	3,792	$14.60	0.6%	$425,147	75,919	$184,129	5
2004	$43,158	3,234	$13.35	0.6%	$402,695	69,615	$234,126	10
2005	$36,769	2,931	$12.54	0.5%	$381,948	67,814	$154,656	7
2006	$36,865	2,924	$12.60	0.5%	$367,791	65,677	$116,121	6
2007	$37,209	2,852	$13.04	0.5%	$355,180	63,425	$141,526	6
2008	$34,929	2,757	$12.67	0.4%	$333,536	59,560	$141,059	7
2009	$33,751	2,688	$12.56	0.4%	$316,148	56,455	$56,128	3
2010	$31,466	2,423	$12.99	0.4%	$303,121	54,237	$10,906	2



INTRODUCING THE SECTIONS OF THE WILDLIFE DIVISION

The Wildlife Resource Assessment Section (WRAS)

As humans, we do a lot of tinkering with our natural resources and ecosystems – sometimes on purpose and sometimes by accident. These systems and resources act as our own species' life support system. The individual living parts of these systems are also called species. The big wildlife species, like moose and bear, are easy to identify as major components of our local wildlife fauna and ecosystems. The smaller invertebrates and microfauna in soils, water, and air also play crucial roles in ecosystem processes and functioning. Some of the services they provide include nutrient cycling, soil aeration, water purification, and pollination – they also feed the larger species. These little 'cogs and wheels' are an important part of our life support system, and as one can imagine, they can be hard to track.

That is what the WRAS staff in Bangor do to help MDIFW fulfill its mission. We assess wildlife resources. What is it? Where is it? How many are there? What habitat features does it use or select? Is there any immediate threat? Is there a long-term threat? Can human or other impacts be mitigated? Is it in danger of local extinction now, and if so, how do we recover it, or, should we even bother to try? What is a suitable distribution and abundance of a species within the state? Is it abundant and productive enough to be harvested, and if so, how so?

From the top of Katahdin and on her side where we find the Roaring Brook mayfly – down to the west branch of the Penobscot where a wading moose feeds on a hot summer day – to the bottom of the Pleasant River in Cumberland County where she clings to her few remaining brook floater mussels – to the sandy beaches of southern Maine where a few nesting plovers run the gauntlet of beachgoers, dogs, ATVs, raccoons, and crows – it's an impossible task, but there are strategies for success. We try new technologies and methods when feasible. We constantly strive for cooperatives and efficient, measurable approaches to conservation, informed by the best available wildlife science. We use a lot of help from landowners and biologists within our own state agencies, from other states and provinces, in federal agencies, in universities, and in private organizations and industry.

We use volunteer assistance when the task is suited to that approach (>4,000 hrs/yr). When money is available through the federal State Wildlife Grants fund (SWG), volunteer time can be matched by those federal dollars to support wildlife conservation, just like we can match federal funds with dollars from the Loon Conservation Plate and Maine's tax-return Chickadee Check-Off funds. Much of our non-game and endangered species work has been funded this way in recent years, but the SWG monies can be gone at the whim of Washington, D.C. – as we almost witnessed this past winter.

Hunters volunteer too. Hunters provide the harvest and biological data we need to track big game populations. Also, we survey hunters for their observations of deer and moose to aid in big game management. Hunters have been critical to wildlife conservation in the U.S. It is on their back and with their wallets that numerous wildlife species were restored this past century. In part, this was the vision of great figures like Theodore Roosevelt and Aldo Leopold – it is a key component of the historic North American Model for Wildlife Conservation and Management. As wildlife management in the 1950s and 60s evolved into wildlife ecology in the 1980s and 90s, it became clearer to wildlife professionals that both the big and small 'cogs and wheels' are critical components of the natural world that we enjoy and need for sustenance.

MDIFW has been a progressive agency with its formalized system for assessing species and incorporating public input into goals, objectives, and strategies that build the management systems for Maine's wildlife. There are, and may always be, shortfalls to the management systems and publicly-derived objectives. We will continue to work with what we have, and we will continue to look for ways to do more with less, so that Mainers' unfilled and formal requests might be met in the future.

Of the 20 WRAS biologists contributing to the projects described in this year's report, there are 6 with PhDs and 11 with M.Sc. degrees – a B.Sc. degree is a job requirement. University degrees and the scientific training that often comes with them can be necessary at times, but they certainly don't mean everything. Often times experience, public relations, or plain common sense are the factors that lend savvy and efficiency to resolving problems. The handful of biologists in both the WRAS and Wildlife Management Section (WMS; described next) of the Wildlife Division collectively offer many centuries of experience as wildlife professionals.

The contents you find in this document scratch the surface of what we do; it is not meant to be comprehensive, only representative. Reports from previous years carry some similar and some different information, often driven by issues *du jour*. These reports are available on our website, and please give us a call if you have any questions or suggestions. A lot of readers will skip right to the big game reports, and that's perfectly natural for a lot of us that hunt. Before you start making fires with this report up-ta-camp, please take some time to read about habitat cooperatives, bats and birds, or dragonflies, rabbits, and turtles. Enjoy.

--Shawn P. Haskell
Wildlife Resource Assessment Section Supervisor

Wildlife Management Section

The regional wildlife management staff of biologists is best described as the Wildlife Division's wildlife *generalists* or the "jack of all trades". The seventeen wildlife biologists who staff the Department's seven regional field offices constitute the majority of the Regional Wildlife Management Section (WMS). Their breadth of knowledge, activities, and job responsibilities range far and wide - often requiring the regional staff to juggle numerous public requests, inquiries, and wildlife management projects at the same time. In essence, the regional wildlife biologist represents the Department in a multitude of public participation arenas and serves as the "state's wildlife expert" within their assigned regional geographic area. They are responsible for implementing the Wildlife Division's management program within those regions.

After reading the WMS overview, you'll probably agree that wildlife management work covers a wide spectrum of possibilities. However, much of what we do relates to managing or conserving specific habitat types and features. Since each species of wildlife has specific habitat requirements that can differ seasonally we must ensure the proper balance and distribution of habitat types across the landscape if we are to maintain healthy wildlife populations. The Department addresses this issue every day using a variety of tools. However, I thought it might be useful to share some examples that every landowner and homeowner could consider benefiting wildlife.

--John Pratte
Wildlife Management Section Supervisor

REGIONAL WILDLIFE MANAGEMENT

Maine is a land rich in contrasts between the boreal and temperate, freshwater and saltwater, upland and wetland, and alpine and lowlands. The state has enormous natural variety and owes its biological wealth to its;

- 22.6 million acres – State of Maine,
- 17.5 million acres of vast forests & rugged mountains,
- 5,600 lakes and ponds,
- 5 million acres of wetlands,
- 31,800 miles of rivers and streams,
- 4,100 miles of bold coastline, and
- 4, 613 coastal islands and ledges.

This mosaic of diverse physical settings supports a wide diversity of wildlife that can be equaled in few other states. Maine is also a transition area, and its wildlife resources represent a blending of species that are at or approaching the northern or southern limit of their ranges;

- 292 bird species (~40 species can be hunted)
- 58 non-marine mammal species (20 can be hunted/ trapped; caribou, puma, and wolf populations are considered locally extinct, or extirpated)
- 20 reptile species,
- 18 amphibian species,
- 56 inland fish species,
- 313 marine chordate, fish, and mammal species,
- >16,000 invertebrate species,
- 2,100 plant species,
- 310 phytoplankton species,
- 271 macrophyte (aquatic plant) species, and
- 3,500 fungi species.
- (These have been documented, but experts believe many more actually exist.)

With such an abundance of resources why does the State need to manage them?
During the 1800s, there was uncontrolled taking of wildlife leading to significant population declines with several species. Fourteen species have been extirpated from the State and 44 species are currently on the States Threatened and Endangered Species list.

Today we have many groups competing for these public resources; hunters, trappers, wildlife viewing, eco-tourism, other recreational activities, and private development. As such, the Department is focused on the protection and enhancement of the state's inland fisheries and wildlife, while at the same time providing for the wise use of these resources.

Assuring the conservation and use of these resources is vital to the state's economy. Fish and wildlife continue to be highly valued by Maine people and the hundreds of thousands of people who come to Maine each year. Economic impacts attributable to the use of these resources amount to over $2.4 billion annually and play a major role in the State's economy.

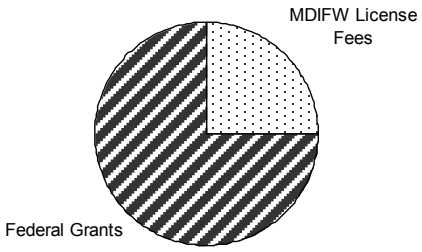
Which resources do we manage for and how?
Detailed studies of the status and needs of wildlife began by the Department in the 1940s to help guide their

management. Armed with better information, the Department's species planning effort began in 1968. Recognizing that many species survival depends on an appropriate supply of quality habitat, our *Beginning with Habitat* program was initiated in 2000. This non-regulatory program has a history of public involvement and collaboration among conservation partners working together to better plan development and conservation efforts. More recently, Maine's Comprehensive Wildlife Conservation Strategy was developed in 2005 that went a step further to provide a vision for Maine and guide us toward that vision.

With a lot of information gathering and planning taking place we now need to look at our funding sources. As you might imagine, each funding source comes with specific obligations for spending those dollars. The Department has many funding sources, but let's look specifically at the funds supporting our Regional Wildlife Staff in the seven regional offices.

The federal funds (Pittman-Robertson funds or PR funds from a 1937 Act of Congress) originate from excise taxes on firearms, ammunition, archery equipment and arrow components. The U.S. Fish and Wildlife Service provides these grant funds to the states' fish and wildlife agencies for restoration, conservation, management, and enhancement of wildlife resources and for perpetuating public use and benefit from these resources. The amount of PR funds Maine is eligible to receive is determined by the size of its human population, the state's land area, and the number of paid hunting/trapping license holders (this can fluctuate). To receive PR funds, each state must provide detailed project descriptions about how the funds will be used, and to renew a project every five years, the state must provide an evaluation of previous activities.

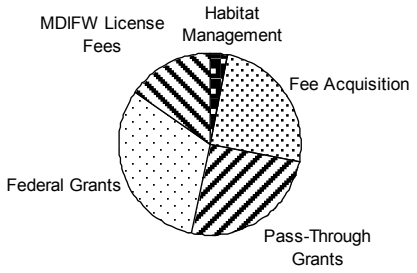
WMS Funding Sources



One of the conditions for using these PR funds is that the MDIFW has a prohibition in place to ensure license fees paid by hunters are used only for the administration of our projects. The potential ratio of these PR funds to license fees is shown above; usually a 1:3 matchable ratio. You can see that most of the WMS funding originates from hunters and trappers.

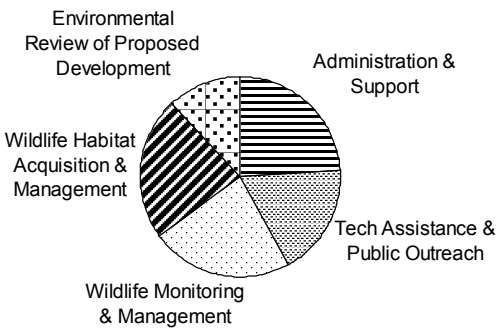
The WMS is also very active with acquisition and management of important habitats. The WMS is responsible for management and maintenance of over 100,000 acres throughout the State, aggregated into 62 Wildlife Management Areas (WMA). One of the great benefits of this is that the public can be assured that over 100,000 acres across all counties within the State will provide public access, recreational opportunities, and wildlife habitats in perpetuity. We also have a wildlife biologist on staff with the Bureau of Parks and Lands coordinating habitat management for wildlife on another 600,000 acres of state lands.

WMS Funding Sources Including Habitat Acquisition



Management of these WMAs is funded with PR funds, license fee dollars, and revenue generated from timber sales as a byproduct of our habitat management. Acquisition of important habitat is funded with additional grants from local, state and federal sources. In the pie-chart to the right you also see "Fee Acquisition" and "Pass-Through Grants". Fee Acquisition projects are those that the Department acquires directly. Pass-Through Grants are funds that support non-governmental organizations efforts to conserve important habitat. These however are required to pass through a state agency as another layer of oversight and review which provides us with an opportunity to further guide efforts of other conservation groups.

WMS Staff Time



Now that we have the information and funds for managing some of our wildlife resources; now what?

The Department averages about 300 employees making up the various programs. Of these, there are 17 regional wildlife biologists working out of our 7 regional offices and 3 biologists focused on habitat management.

For the most part these are the wildlife biologists with boots on the ground working with the public, state agencies, other conservation partners, and businesses on wildlife issues. What projects they work on and how frequently is dictated to some degree by Department mandates, pre-determined goals and objectives, our funding obligations, and unpredicted urgent public needs. Staff time can be broken into five broad categories as shown above and described below.

Wildlife Monitoring and Management
We continue to monitor wildlife species trends and/or population densities and adjust for their management accordingly. For example, we monitor waterfowl nesting rates and production and use this information to guide our hunting season dates and bag limits, which in turn reduces or increases waterfowl take by hunters. Another example is monitoring furbearer harvests by trappers and other data to then adjust trapping season lengths and bag limits.

Staff spend a significant amount of time collecting biological data from moose and deer which are some of the key inputs into our management system. These data are provided by hunters at certain times and locations when they register their harvested game. This also provides a great opportunity to interact with the public, answer questions, and learn more about your hunting experiences.

Wildlife Habitat Acquisition and Management
The WMS is charged with WMA management consisting of a myriad of habitat types and recreational opportunities: from backwater flowages supporting rare, threatened, and endangered flora and fauna, to dense softwood canopy cover used by deer during harsh winter stretches, to old-field and dense young forest growth ideal for ruffed-grouse courting, nesting, and brood rearing. These same habitat provisions often provide ideal places for recreational activities to the hunter, fisherman, hiker, naturalist, photographer, and many other recreational user groups.

The main goal of the Lands Management Program is to provide optimal wildlife habitats based on species management plans and the objectives determined by the Regional Wildlife Biologists. The program also provides for recreational access and activities of both the consumptive (such as hunting, fishing, and trapping) and non-consumptive (such as hiking, biking, horseback riding, etc.) uses. As can be expected, recreational opportunities on WMAs are a main benefit provided to the public. Recreational uses centered on wildlife recreation such as hunting, fishing, and wildlife watching have dwarfed Maine's other recreational industries, with such activities providing over 1.5 billion dollars to the Maine economy in 2006 alone (http://www.beginningwithhabitat.org/about_bwh/maines_wildlife_legacy.html). Anecdotal evidence in conversations and observations of activities on WMAs support this trend in recreational uses.

Environmental Review
One of the most important jobs of the Wildlife Management Section is reviewing development proposals to ensure that impacts to regulated wildlife habitats, as well as to endangered, threatened, and special concern species, are identified and addressed. State and Federal environmental agencies, municipal governments, consultants, landowners, and

businesses regularly ask regional biologists to assess the effect of development and changes in land-use on wildlife or wildlife habitat. Over an average year, WMS biologists provide 1,900 such assessments as they worked with various entities to encourage land-use decisions that are sensitive to the habitat needs of wildlife. Balancing the need to manage a public resource against the rights of individual landowners requires thoughtful compromise and reliable information about where important resources occur. The workload for environmental reviews can change over time and across the different regions depending on where projects occur, but in general it has been increasing in number and complexity. While the number of requests has increased, the increased size and complexity of the projects staff are reviewing is even more notable. We have seen a wave of new energy development technologies, some with massive federal subsidies, requiring staff to develop new review criteria and protocols to rapidly detect and measure potential wildlife impacts. We have also seen many project applicants request pre-application consultation meetings to incorporate wildlife needs and concerns during the project design phase rather than after they submit a plan to LURC or DEP. Just as the sophistication of project-design has increased dramatically, so has the Department's effort, as we continue to update our wildlife habitat data using new resources and protocols to provide more accurate and consistent information to all project applicants.

Technical Assistance and Public Outreach
As previously demonstrated, Maine has a variety of resources over a very large area. To add another layer of complexity, our wildlife have specific habitat requirements, and those habitats are most often owned by private and business interests. So to further extend our efforts, reaching out to the public effectively is critical. We spend a significant amount of time helping landowners understand how their actions and efforts can benefit wildlife, often quite easily. Not only does this benefit wildlife, it also provides more opportunity for us to enjoy these great resources. Staff attend forums throughout the year to listen to your concerns and hear what opportunities you would like improved. We also spend time helping the homeowner with a raccoon in the attic or the landowner with a culvert plugged by beaver.

Administration and Support
Coming in at 24% of staff time this may appear high, and in reality, this number is actually lower. (Simply a relic of how staff time is recorded.) The important point to note here is that working for the public and within the obligations of our federal funding requires diligence tracking our activities.

The Wildlife Management Section is part of the MDIFW team that has helped lead to Maine having the largest population of bald eagles in the Northeast. Maine's coastal islands support one of the most diverse nesting seabird populations on the East coast, including habitat for rare species such as the Roseate and Arctic Tern, Atlantic Puffin, and Razorbill Auk. Maine's relatively clean free-flowing rivers sustain some of the best remaining populations of rare freshwater mussels and dragonflies in the East. Globally rare endemics, such as the Tomah mayfly (*Siphlonisca aerodromia*) and Roaring Brook mayfly (*Epeorus frisoni*) and the Atlantic salmon (*Salmo salar*) may be found in Maine's many rivers and streams. Maine's mountains and forests provide important breeding habitat for neo-tropical migrants such as Bicknell's Thrush and Blackthroated-blue Warbler. Additionally, Maine has some of the best examples of pitch pine-scrub oak forest remaining in New England, hosting a suite of globally rare plants and invertebrates. WMS staff work tirelessly with all of these species, game and non-game, and their habitats so the citizens of Maine may enjoy them in perpetuity.

-Wildlife Management Section Staff

WILDLIFE HABITAT PROTECTION AND CONSERVATION

We're All In This Together

Over the past year, Beginning with Habitat staff has visited town halls from Ogunquit to Wallagrass. We've assisted in the drafting of more than two dozen local comprehensive plans. We've been a partner at the table for 10 regional conservation planning efforts, that combined include nearly 20% of Maine's organized towns, and we've helped multiple land trusts identify significant conservation projects and draft compelling grant applications. The reason for this effort is simple; the MDIFW has identified 213 species of greatest conservation need, and 140 Priority Conservation Focus Areas of Statewide Ecological Significance in our State Wildlife Action Plan (arguably the conservation blueprint for the State of Maine). The Plan includes page after page of prioritized actions deemed necessary to slow and hopefully reverse declining population trends of so many of Maine's non-game wildlife species. The resulting habitat conservation priorities will greatly enhance Maine's populations of game species as well. Taking on the challenge of implementing our state's Wildlife Action Plan is a job that goes well beyond the ability of MDIFW working independently.

Maine's Wildlife Action Plan was crafted with the assistance of committed partner groups representing the state's primary conservation organizations, hunting and angling interests, and sister state and federal agencies. These same partners working collaboratively will certainly improve the prospects for effective plan implementation, but much more is needed still, especially given the challenges future generations will face in conserving our natural resources under unprecedented

climatic conditions and rapid human-population growth pressures. Effectively conserving Maine's plants and animals now and setting the stage for future functional habitats will take a true grass-roots effort. Each town, each land trust, and each landowner has a key role to play in the implementation of Maine's Wildlife Action Plan if we are to be successful.

As a former town planner, a current planning board member, and a current land trust board member, I have experienced first hand the challenges associated with evaluating land-use choices and setting local conservation priorities. For the past 10 years, the Beginning with Habitat program has evolved into a one-stop source of information and assistance to help align local land-use and land-management decisions with regional and statewide conservation priorities. Given home-rule authority and familiarity with local landowners, Maine towns and land trusts are in the best position to effectively conserve resources locally that provide critical functions in Maine's larger ecological landscape. Whether protecting a large forest block with the intent of creating a town forest, or acquiring rare species habitats through private donations to a local land trust, each contribution to State Wildlife Action Plan objectives by any one of Maine's organized towns is significant progress.

Not familiar with Beginning with Habitat? The program is designed to translate Maine's statewide Wildlife Action Plan conservation priorities into a format that is usable at the local level by local committees and land trust boards. Our maps are continually being revised and updated to reflect improved knowledge of the Maine landscape and in response to needs identified by user groups. Just recently, the Beginning with Habitat map package was updated to include statewide native brook trout data, resulting from a multi-year field effort and results from a statewide habitat connectivity analysis, geared to help towns protect habitat corridors. Beginning with Habitat continually improves its approach to delivering data and assistance matched to the specific needs of local partners in order to most efficiently achieve on-the-ground results. Aside from meeting with municipal committees and elected officials, we regularly meet with land trust boards, fish and game clubs, watershed associations, and student groups. Through each meeting we hope to build relationships with local conservation champions and facilitate local conservation efforts in any way we can.

While there are roughly 470 organized towns and 100 local land trusts in Maine, as well as the thousands of landowners who make conservation happen, there are only two Beginning with Habitat staffers. Simply keeping up with data requests and local presentations is often challenging. To improve our effectiveness and efficiency in delivering the type of support necessary to our local partners, we need to increase our staff capacity in each of MDIFW's seven regional offices. Previously, Beginning with Habitat had a position in Region A that includes Maine's most biologically diverse wildlife communities and fastest developing towns. When vacated, this position was never filled due to budget constraints and has subsequently been eliminated. During this economic crisis, budgets at all levels of government have been hard hit, but some of the most visible consequences of budget-cutting are at the local level.

Beginning with Habitat is one of the last remaining natural resource programs that provide planning assistance directly to town halls. It is common knowledge that plans are only as good as the results they produce on the ground. However, both conservation planning and, more importantly, plan implementation require that funding reaches the local level where it is needed the most. Should MDIFW ever receive a dedicated source of state funding, my vision for the Beginning with Habitat program would be to have regional habitat planners within as many MDIFW regional offices as possible. They could provide direct assistance to towns and land trusts and back-up our planning assistance with a local grants program that could help towns and land trusts jump-start work directly with those who need assistance the most: Maine landowners.

--Steve Walker
Beginning with Habitat Program Coordinator

Wildlife Habitat Group

Donald Katnik, Habitat Group Leader - Supervises Group activities and coordinates habitat-related projects with other Division and Department staff and other State and Federal agencies.

MaryEllen Wickett, Wildlife Biologist and Programmer/Analyst - Develops computer applications to facilitate access to habitat data by MDIFW staff and other users. Provides technical support and habitat data analyses for landscape planning efforts and development of species habitat models.

Amy Meehan, Wildlife Biologist and GIS Specialist - Collects wildlife habitat data from Regional Wildlife Biologists and others. Creates and maintains computer databases. Conducts field inventories of wildlife habitat and provides Geographic Information Systems (GIS) support for a variety of projects.

Jason Czapiga, GIS Coordinator - Develops, maintains, and analyzes databases of wildlife observations and habitat. Provides assistance to other Division biologists to assess species habitats on a statewide basis.

Vacant, Oil Spill Biologist - Coordinates oil spill response planning efforts for the Wildlife Division, including sensitive area identification and wildlife rehabilitation plan design and implementation.

Wildlife Habitat Programs

Habitat Mapping

Creating and maintaining maps and related information for wildlife habitats is the primary function of the Habitat Group. We currently manage 2 data sets of Essential Wildlife Habitats (Piping Plover/Least Tern, Roseate Tern), which are defined and protected under Maine's Endangered Species Act. We manage 6 Significant Wildlife Habitat data sets (Deer Wintering Areas, Inland Waterfowl/Wading bird Habitat, Seabird Nesting Islands, Shorebird Areas, Tidal Waterfowl/Wading bird Habitats, and Significant Vernal Pools) defined and protected under Maine's Natural Resources Protection Act. We also manage a database of observations and associated habitats for Endangered, Threatened, and Special Concern wildlife species. These data are used for species assessment and management plans, environmental protection, and landscape planning. Landscape planning is accomplished through Maine's "Beginning with Habitat" program that distributes the data managed by the Habitat Group and other natural resource information to land trusts and municipalities.

Use of these maps both within and outside MDIFW has become much more sophisticated over the last decade, as the availability and capabilities of mapping software such as GIS and *GoogleEarth* increase. Keeping these habitat maps current and accurate is a critical part of Habitat Group's responsibilities. New information is continually being added and existing information updated as new data sources become available. Aerial photos are our primary means of mapping wildlife habitats. The availability of high resolutions photos has increased dramatically in recent years; we now have complete coverage of the state of Maine and in many areas have photos from multiple years and seasons, which greatly improves our ability to map habitats from them. Ground-verification will always be an important part of the mapping process – it enables us to ensure that we are correctly identifying different habitats from the aerial imagery, but lacks the landscape context that the imagery provides (habitats often cover extensive areas – a ground observer can see only a small part of the habitat area, much of which often cannot be easily accessed from the ground). The two methods must be used together to provide the accuracy of information required for the current uses of these maps.

Ideally we would have a regular schedule for updating these maps, but staffing limitations, the size of the Maine landscape, and the sheer number of habitat areas (over 10,000 wetlands just in Maine's organized townships) have kept us in a reactionary mode where we can only focus on those data sets in most need of updating. Currently that is our Tidal Waterfowl/Wading bird Habitat areas which are based on outdated National Wetlands Inventory (NWI) and Coastal Marine Geologic Environments data. These areas are protected under Maine's Natural Resources Protection Act. More importantly, these habitat areas are part of the Environmental Sensitivity Index (EVI) maps published by the Maine Department of Environmental Protection for responding to marine oil spills. These EVI maps show initial spill responders where to put immediate effort to protect the most sensitive areas of Maine's coastline so it is critical that the wildlife habitats depicted on those maps are current and accurate. The Habitat Group has been working for the past year on remapping these coastal habitats from high-resolution, low-tide imagery. This summer we are ground-verifying the areas mapped from the imagery. In the past we were able to use the Oil Spill Surface Fund to support these activities, but that fund has been declining with the depressed economy.

Oiled Wildlife Response in Maine

MDIFW has 4 primary job responsibilities related to oil spills: 1) pre-spill planning; 2) spill response; 3) rehabilitating oiled wildlife during and after a spill; and, 4) coordinating with other state and federal trustees to assess damages to natural resources. Planning for oil spills includes updating state, regional, and international contingency plans and participating in drills. All MDIFW staff that would be involved in a spill response must having training in First Aid/CPR, hazardous materials, and the Incident Command System (ICS) used during emergency responses. Many oil spills occur every year in Maine. MDIFW responds when oiled wildlife have been observed or when the potential for wildlife to become oiled exists, such as when sensitive wildlife habitats are oiled. Trained biologists respond with all the equipment needed to ensure their safety (protective suits, gloves, and boots) and to capture and transport oiled wildlife (nets, traps, and pet carriers). Maine has a contract with International Bird Rescue Research Center (www.IBRRC.org) to assist with any response that exceeds our local capacity to rehabilitate oiled wildlife. Local wildlife rehabilitators are critical to responding to smaller spills and would work with IBRRC during larger spills. The National Resource Damage Assessment (NRDA) process allows MDIFW to work with the other state natural resource trustees (Department of Environmental Protection, Department of Conservation, and Department of Marine Resources), and federal trustees (U.S. Fish and Wildlife Service and National Oceanographic and Atmospheric Administration) to determine how funds paid by the Responsible Party (the spiller) will be used to mitigate damages. Examples include restoration and research projects or purchasing conservation lands.

--Donald Katnik

WILDLIFE SPECIES PLANNING AND MANAGEMENT

Implementing successful wildlife management begins with a well thought-out plan. To develop the plan, the Wildlife Division has developed a comprehensive species planning process. The major components of the process are: a **species assessment** that summarizes what we know about a particular species or group of species; input from a **public working group** to develop species management goals and objectives; and finally, a **species management system** that lays out a path to achieving the goals and objectives. Maine's species planning process is a "state of the art" approach to integrating public participation into our decision-making process. It is also a critical component of Maine's Wildlife Action Plan (http://www.maine.gov/ifw/wildlife/groups_programs/comprehensive_strategy/index.htm). The following is a summary of the species planning efforts over the past year.

We have put much of the species planning effort on hold due to other high priority demands on biologist's time; however, we made a little progress. Jennifer Vashon put the finishing touches on the Canada Lynx Assessment and it has undergone review by Mammal Group staff; it will undergo review by Department staff and other experts before a public working group develops management goals and objectives for lynx in 2011. The Commissioner and Advisory Council did approve management goals and objectives for freshwater mussels, upland sandpipers, and grasshopper sparrows on January 26, 2011.

Administration and staff will be revisiting the planning schedule for 2011, so it is unclear which planning documents we will complete during the coming year, other than the Canada lynx assessment and convening the public working group. We should note, however, that Wildlife Division biologists have developed species assessments for 234 species, and management systems for 203 of those species. Some of these assessments and management systems need updating; nonetheless, it represents a tremendous commitment by the Wildlife Division to make species planning transparent and publically driven. Many of the 15-year plans, including those for big game, will be due for an update in the near future.

If you are interested in reviewing the Wildlife Division's species planning documents, please visit our website at http://www.maine.gov/ifw/wildlife/species/plans/index.htm.

ENDANGERED AND THREATENED SPECIES CONSERVATION

Perhaps the most challenging area of wildlife management is recovery of Endangered and Threatened species. The Wildlife Division staff has invested considerable effort in identifying species at risk and developing plans to recover these species to the point they can be delisted. You can find specifics of what the Wildlife Division is accomplishing for Endangered and Threatened wildlife in subsequent sections of this report.

Since European settlement, at least 14 species of wildlife have been extirpated from Maine. To prevent further losses, the Maine Endangered Species Act was enacted in 1975. In 1986, Maine's first list of 23 Endangered and Threatened species was adopted. After MDIFW reviewed the status of many of Maine's wildlife species in the mid-1990s, the Legislature added 20 new species to the list in 1997. The most recent revision of the list occurred on May 24, 2007. Changes included 14 new listings, 1 delisting, a change of status from Endangered to Threatened for 1 listed species, and adding the qualifier "breeding population only" to 2 species already listed as Endangered. To obtain a PDF version of what was proposed to the Legislature and eventually enacted, go to http://mainegov-images.informe.org/ifw/wildlife/species/pdfs/etlist_recommendations.pdf.

During the 2009 Legislative Session, the Legislature approved removal of the Bald Eagle from Maine's list of Endangered and Threatened species. Governor Baldacci signed the removal into law during a special ceremony on May 26, 2009. The law will become effective in September 2009. You can review the Department's rationale for recommending delisting the Bald Eagle at http://www.maine.gov/ifw/wildlife/species/endangered_species/baldeagle_delisting.htm.

PLEASE NOTE that there is a separate list for state Endangered and Threatened marine species. The Maine Legislature has given The Maine Department of Marine Resources responsibility for maintaining and updating that list. http://janus.state.me.us/legis/statutes/12/title12sec6975.html. Also, this position, responsible for coordination of species planning and other special efforts for endangered and threatened species, has been retired and frozen.

--George J. Matula, Jr.
E&T Species Coordinator & Wildlife Planner

Bird Group

The breadth of the Bird Group's programmatic responsibilities involve stewardship of 223 bird species that nest in Maine, and many more that migrate through or winter in Maine. Several of Maine's birds occur statewide, but others occur only in portions of the state. Maine has a very diverse landscape and consequently a myriad of habitats suitable for various bird species. At least 29 inland breeding species of birds reach the northern limits of their breeding distribution in Maine, 28 species at their southern limits, and 2 species at their eastern limits. In addition, many of Maine's island-nesting seabirds reach their southern breeding terminus on Maine's islands, like Atlantic puffins and razorbills. The peregrine falcon and wild turkey have been reintroduced in Maine. The peregrine population is slowly increasing, and the wild turkey has expanded into areas beyond our expectations. Other species, such as the turkey vulture, blue-winged warbler, evening grosbeak, American oystercatcher, sandhill crane and several species of wading birds, have expanded their breeding range into Maine at various times over the past century.

As some of you know, many citizens of Maine and individuals at MDIFW were hoping that a proposal to amend the State's Constitution to use a minor portion of the sales tax for the protection of Maine's Fish and Wildlife would go before the voters in November. Unfortunately, this bill did not survive the last Senate vote. MDIFW has been chronically underfunded for decades, and this Group has seen its budget shrink along with the generous donations made to Maine's special conservation funds such as the Loon Plate and tax-return's Chickadee-Checkoff. We know that Maine's fish and wildlife resources are vital to our state's economy. With additional funds, the Bird Group could finally address many of the objectives identified in bird species plans. Further, we could support and enhance department capabilities in bird habitat protection and management initiatives; provide funding and staff to survey, monitor, and research all major game birds and all Maine-listed endangered and threatened birds; and develop, expand, and implement a public outreach plan to promote an understanding and awareness of state endangered and threatened birds. We remain excited to think of all the work we could accomplish with enhanced funding.

Brad Allen, Bird Group Leader – Brad oversees group activities and budgets and currently is conducting a common eider survival study. Brad also coordinates Department interests in seabird research and management activities.

Danielle D'Auria, Wildlife Biologist – Danielle is the Department's species expert on marshbirds, wading birds, common loons, and black terns. Over the past two years she has also devoted a great deal of effort to heron surveys and coordination of a volunteer heron monitoring program. Her other field related duties include marsh bird surveys and research, black tern surveys, and inland seabird surveys.

Thomas Hodgman, Wildlife Biologist – Tom develops and implements programs and surveys to assess the status of songbirds in Maine and coordinates several priority bird research programs. Tom's recent focus is working with two graduate students studying saltmarsh sharp-tailed sparrows and rusty blackbirds. Tom routinely provides technical assistance and advice to the Wildlife Management Section regarding bird migration and the ever-expanding windpower development.

Kelsey Sullivan, Wildlife Biologist – Kelsey coordinates waterfowl banding programs, surveys, and research to assess the status of game bird populations in Maine. Game bird species that Kelsey is responsible for include ruffed grouse, American woodcock, wild turkeys, ducks, and Canada geese. He is Maine's representative on the Atlantic Flyway Council Technical Section.

Charlie Todd, Wildlife Biologist – Charlie has devoted 30 years of his professional career to the recovery of bald eagles in Maine, culminating in the delisting of bald eagles two years ago. Charlie also leads MDIFW's peregrine falcon recovery program. Charlie's experience makes him a valuable advisor to other staff on all Endangered and Threatened bird species issues.

Lindsay Tudor, Wildlife Biologist – Lindsay coordinates the Department's shorebird program with current emphasis on shorebird habitat protection under the Natural Resources Protection Act and piping plover and least tern management. Lindsay's research involves the ecology of purple sandpipers wintering in Maine and her primary survey responsibilities include all shorebirds and harlequin ducks.

The Bird Group would like to thank the following dedicated individuals who have assisted us with our bird conservation and management tasks over the last year: Scott Hall, Maine Warden Service pilots: Charlie Later and Dan Dufault, John Drury, Glen Mittelhauser, Dave Hiltz, Chris West, Don McDougal, Jim Dyer, Bill Hanson, Chris DeSorbo, Wing Goodale, Lucas Savoy, Bruce Connery, Lesley Rowse, Joe Wiley, Margo Knight, Don Mairs, Ron Joseph, Patrick Keenan, Bill Johnson, Diane Winn, Bill Sheehan, Don McDougal, Thomas Cochran, Marc Payne, Maine Audubon, Linda Welch, Don Reimer, Scott Kenniston, Dick Hutchinson, Libby Mojica, John Sewell, many Heron Observation Network volunteers, many private landowners who have granted us access to their property for surveys and monitoring and MDIFW regional staff.

3rd Year for the Heron Observation Network

The Heron Observation Network, or HERON for short, is a group of volunteers who have adopted wading bird colonies across the state. Adoption includes the commitment to check on a colony at least once during the breeding season (May-July) to determine if the colony is active (i.e. being used by herons, egrets, or ibises) and the approximate number of active and inactive nests. Volunteers who have more time to contribute may visit a colony every couple of weeks in an effort to gauge the productivity of the colony (number of birds fledged per nesting pair) and a timeline for each of the nesting stages (incubation, nestling, and fledgling). Only colonies that can be viewed from a distance that does not cause disturbance to the nesting birds are monitored by volunteers during the breeding season. In 2009, HERON's first year, 47 volunteers adopted 68 wading bird colonies. In 2010, those numbers grew to 63 volunteers monitoring 82 colonies; and this year we now have 76 volunteers monitoring 116 colonies! Most of these colonies are occupied by great blue herons, a Species of Special Concern due to an apparent population decline along the coast and possibly statewide. Other species that may nest in such colonies include black-crowned night-heron (State Threatened), snowy egret, glossy ibis, great egret, little blue heron, cattle egret, and tricolored heron.

Since the conclusion of the 2009 aerial and ground survey effort, 29 new colonies have been reported, and most of those were active this year. There are likely more colonies to be discovered. If you know of a wading bird colony, please don't hesitate to report it. Or, if you'd like to join the Heron Observation Network and adopt a colony yourself, please contact Danielle D'Auria, danielle.dauria@maine.gov, 941-4478. For more information on HERON, and Maine's colonial wading birds, visit http://maineheron.wordpress.com/.

This work is supported by volunteer assistance, federal State Wildlife Grants and state revenues from the Loon Conservation Plate and Chickadee Checkoff Funds.

--Danielle D'Auria

S.H.A.R.P. – The Saltmarsh Habitat and Avian Research Project

The Atlantic Coast of North America possesses the largest expanse of tidal salt marsh and the highest concentration of endemic marshbirds in the world. The properties of this ecosystem, however, present unique challenges to the conservation of its inhabitants requiring a regional and collaborative approach to conservation. A little over a year ago, the U.S. Fish and Wildlife Service awarded just over $760,000 to a four-state partnership to examine the conservation of birds using tidal marshlands in the northeast U.S. The states of Maine, Connecticut, Delaware, and Maryland working in cooperation with the University of Maine, University of Delaware, and the University of Connecticut began field work on this 3-year multi-faceted study in May 2011.

The project includes two major components: a survey of the birds nesting in coastal marshlands from Virginia to Maine as well as a series of in-depth nesting studies. General objectives of this project are to: 1) fill all regional gaps in current surveys within the northeast region to produce population estimates for all bird species found in the high tidal marsh (including a global estimate for saltmarsh sparrow) and identify regional population centers, 2) repeat historic surveys, where they exist, to provide estimates of population change, 3) collect detailed demographic data at three sites (Maine, Connecticut, New Jersey) across the northeast to model geographic variation in productivity and survival of key species, 4) relate these data to past conservation actions where records of past management exists, 5) provide the ten coastal states in the northeast region with a detailed description of their regional responsibility for each of 26 Species of Greatest Conservation Need, 6) identify the most critical areas for the long-term preservation of the tidal marsh bird community within each state, and 7) build on an existing working group of local, state, and nongovernmental stakeholders to implement conservation actions throughout the northeast stemming from the findings of this project.

This project will provide information for the New England and Mid-Atlantic Coast States to protect regionally important habitats for tidal marsh birds of conservation concern, such as American black ducks, willets, and saltmarsh sparrows. It will provide a platform for monitoring tidal marshbird populations that is consistent across the region in anticipation of sea-level rise and upland/watershed development. This project dovetails with several on-going federally funded projects, and will thus help national efforts to evaluate the effects of sea-level rise on marsh birds. Knowing where important populations occur and understanding their population dynamics will enable conservation efforts for this community for decades to come.

This work is supported by the federal State Wildlife Grants program, and state revenues from the Maine Outdoor Heritage Fund, Loon Conservation License Plate, Chickadee Checkoff Funds, and the University of Maine.

--Thomas P. Hodgman

Game Birds

MDIFW contributes to several programs that assist the USFWS in assessing migratory game bird populations and harvests. To assess populations, several surveys are conducted throughout the year that target specific migratory bird species groups such as sea ducks and dabbling ducks. Following each migratory bird hunting season, harvest is measured using: 1) the Harvest Information Program (HIP) with data on harvest numbers, active hunters, and days afield; 2) the Wing-Collection Survey where hunters contribute wings of harvested birds that serves as a measure of productivity (or recruitment); and, 3) analysis of band recoveries from numbered bands placed on birds prior to the fall hunting season that can provide estimates of overall survivorship of a species.

American Woodcock

Nationally, American woodcock management is divided into two units, east and west of the Appalachian Mountain Chain. These are known as the Eastern and Central Management Units or EMU and CMU. Maine is one of the most important states for breeding woodcock within the Eastern Management Unit (EMU).

Each spring, beginning in 1968, a coordinated survey called the Singing Ground Survey (SGS) is conducted across all woodcock states. Each survey participant records the number of singing male woodcock they hear in the spring on specific routes distributed throughout Maine and their breeding range. 50 routes were run in Maine in 2011 by MDIFW staff, USFWS staff, and a number of other volunteers. The long term trend (1968 to 2011) indicates a decline in American woodcock numbers across their range; however 2011 is the eighth year in a row that the EMU population appears stable. In 2011, the number of males heard on Maine's SGS routes (3.58) was slightly higher than last year (3.41) and was above the 10-year average of 3.42.

Woodcock Hunting Season - October 1, 2010 to October 30, 2010

Based on data from HIP, approximately 7,100 woodcock hunters harvested 31,700 woodcock in Maine last year. This was a significant increase in harvest compared to last two previous years. The recruitment rate of 1.5 immature (young of the year) to one adult female in 2010 harvest was slightly below the long term average (1963–2010) of 1.7 immature woodcock per female. Recruitment rate is a measure of the ratio of immature woodcock per adult female derived from the Wing-Collection Survey described above. Maine hunters provided 1,546 wings to that survey.

Waterfowl

Waterfowl harvest metrics are also derived from the same Harvest Information Program used to assess woodcock harvest. Harvest information for the 2003 to 2010 waterfowl seasons are listed below in Table 2.

Table 2. Maine Waterfowl Harvest 2003-2010.

Species	2003	2004	2005	2006	2007	2008	2009	2010*
American Black Duck	5,045	5,765	7,623	5,387	5,000	4,683	5,364	3,377
Mallard	12,025	12,218	16,855	12,231	12,700	11,265	12,711	8,379
Green-Winged Teal	5,248	2,750	3,077	4,309	6,100	7,872	4,923	3,189
Wood Duck	3,822	4,231	6,224	5,577	5,400	3,461	7,641	8,567
Ring-necked Duck	459	529	699	1,300	300	747	1,763	1,688
Common Goldeneye	357	1,745	3,777	2,091	1,600	2,307	1,469	313
Total	26,956	27,238	38,255	29,895	31,100	30,335	33,871	39,100
Canada Goose	9,637	7,000	7,826	9,800	9,100	13,800	4,700	9,194
Sea Ducks								
Common Eider	28,967	14,736	10,842	18,133	13,100	11,143	4,355	4,505
Long-tailed Duck	2,612	1,754	690	1,779	1,000	4,305	656	2,321
Scoter	14,721	4,210	2,168	2,288	1,700	4,052	890	1,092
Total Sea Duck Harvest	46,300	20,700	13,700	22,200	15,800	19,500	5,901	7,918
Total Waterfowl Harvest	82,893	54,938	59,781	61,895	56,000	63,635	44,472	42,625

*Preliminary Estimates

Based on these HIP data, an estimated 5,600 active waterfowl hunters shot approximately 42,600 waterfowl in Maine (a total that includes puddle ducks, diving ducks, sea ducks and geese) in 2010. The 2010 total harvest was near the 2009 harvest of 44,400 waterfowl. In 2010, the number of waterfowl hunters was greater than the 2009 estimate of 3,900.

Wild Turkey

The wild turkey program is a great success story in wildlife restoration and has allowed MDIFW to provide hunters the opportunity to harvest wild turkeys during both spring and fall hunting seasons in Wildlife Management Districts (WMDs)

that meet specific population and habitat criteria and harvest levels. Spring turkey hunting is the season of choice for the majority of turkey hunters when male turkeys are responsive to hunters' calls. Although spring wild turkey hunting license sales have declined in recent years, the harvest success rate remains high at over 30%. The fall harvest remains low, but spiked in 2007 with the introduction of a week-long shotgun season in certain WMD (Table 3).

Table 3. Wild Turkey Spring (1999-2010) and Fall (2002-2010) Harvest.

Season	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Spring	890	1559	2544	3391	3994	4839	6236	5931	5984	6348	6043	6077
Fall	NA	NA	NA	151	246	204	157	198	1843	685	712	1205

The 2011 spring wild turkey hunting season marked the second year that hunters could purchase a combination spring/fall wild turkey hunting permit for $20. This permit allows the holder to take one bearded bird in the spring and one bird (either a male or female turkey) in the fall. Hunters may choose to take an additional bearded bird in the spring if they purchase a second tag. Youth hunters with a valid junior hunting permit are not required to purchase a separate wild turkey hunting permit. The total spring 2010 turkey harvest (6,077) was similar to 2009 (6,043) when hunters could only take one bearded turkey/season, so increased opportunity for hunters in 2010 did not result in substantial additional take of the turkey population.. The spring 2010 harvest resulted in 4,161 hunters registering one bird, with 958 hunters registering two birds.

The Department continues to increase wild turkey hunting opportunity in WMDs with stable or increasing wild turkey numbers. As a result, two WMDs were added to the spring wild turkey hunting season. These were WMDs 19 and 28 in the Downeast and eastern portions of Maine. In addition, the spring harvest in some WMDs has reached levels that allow consideration for additional fall hunting opportunity. The Department uses registration results from the spring harvest to determine when and where a fall hunting season can occur. MDIFW will consider recommendations for additional fall hunting opportunity for October, 2011.

Ruffed Grouse

Beginning in 1994, moose hunters are asked to report the number of grouse (partridge) they and their party see or shoot during the moose hunting season. Data are compiled by geographic region and MDIFW calculates the number of grouse seen per 100 hours of moose hunting effort. This past season (2010), observed grouse numbers were very similar to 2009, and well above the lowest numbers recorded over the 17 year survey in 2005. Factors such as weather and predator population numbers contribute to the peaks and valleys observed in grouse population cycles.

Table 4. Grouse Seen or Harvested/100 hours of Moose Hunter Effort in Maine for the last 15 years (1996-2010).

Location	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Northeast	15	24	42	41	30	53	23	35	27	11	26	37	31	48	47
Northwest	22	33	48	47	50	55	43	50	56	24	45	44	51	101	101
Eastern Lowlands	16	22	27	30	25	55	29	29	24	8	20	53	23	34	34
West & Mountains	23	26	41	29	28	30	25	26	30	13	25	44	19	36	36
Downeast	-	-	-	-	-	-	13	21	20	9	22	19	28	30	29
Statewide	20	25	43	37	33	48	31	34	33	13	24	39	27	47	46

This work is supported by volunteer assistance, the federal Pittman-Robertson Funds program, and revenue from the sales of hunting licenses.

--Kelsey Sullivan

Raptors: Recent Population Highlights

Bald Eagle

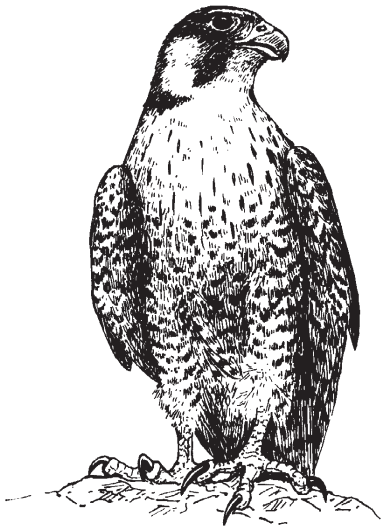
Limited surveys in 2011 supported an interagency research study in coastal Maine and 12 major environmental permit reviews across the interior. These efforts collectively monitored 60% of previously documented nests; 24 new, alternate nest locations in these areas; and 17 new nesting territories. The current statewide breeding population is estimated at > 600 nesting pairs. The next statewide inventory is planned during 2013 but will be contingent on adequate funding.

The extent of population recovery is such that intensive annual surveys and regulatory protection of nests as Essential Habitats are no longer warranted. However, site-specific information from surveys helps landowners comply with national management guidelines and avoid prohibitions in the primary legal standard: a federal law, the Bald Eagle – Golden Eagle Protection Act (see Internet link http://www.fws.gov/northeast/EcologicalServices/eagle/guidelines/index.html). The USFWS has primary authority for these policies. MDIFW will continue to work with landowners of eagle habitat and

conservation partners to promote acquisitions, conservation easements, and cooperative management agreements to bolster the "habitat safety net" for eagles to safeguard the long-awaited species recovery.

Golden Eagle
This species occurs sparingly in all seasons, but no active nests have been found since the late-1990s. A four-year old adult female equipped with a satellite transmitter now spends 6 months a year in Maine but ranges widely across the northwestern one-third of the state with occasional excursions to neighboring Quebec and New Hampshire (see http://ccb-wm.org/programs/migration/GoldenEagle/74418tracking.htm). She winters in mid-Atlantic states from November through February. Maine joined other eastern states and provinces for a review of species status in the region. Maine, New Hampshire, and New York all recognize golden eagles as "Endangered" under state authority.

Peregrine Falcon
Nesting peregrines have been monitored annually since the breeding population was re-established in the late-1980s following an earlier reintroduction program. Surveys usually tally only 25 nesting pairs, but we suspect a few more. Suitable habitats range from cliffs in Maine's interior mountains, coastal headlands, tall buildings in urban areas, or even large bridges. Despite the diversity of nest settings, peregrine falcons require open areas for foraging. Please report all peregrine falcon sightings to a MDIFW wildlife biologist.



Merlin
Once known as "pigeon hawks," nesting merlins have been present in Maine for at least 30 years. Increasing numbers, natural expansion of breeding range southward, and wide array of suitable habitats diminish the urgency to monitor this woodland falcon. However, Maine is collaborating with Idaho researchers for a genetics study to better understand the uniqueness of expanding merlin populations. Please report any known or suspected nest locations to a MDIFW wildlife biologist.

Osprey
Although broadly distributed and locally abundant, nesting ospreys are either markedly shifting their distribution or declining regionally. Increasing numbers of bald eagles and the intense rivalry between these species for fish and nests may induce these changes. Setbacks in some key diadromous fisheries (alewives heading upstream to spawn, eels heading out to sea to spawn) may promote more dramatic interspecific competition in Maine than noted in the Chesapeake Bay region or in Florida. Preliminary surveys in conjunction with BioDiverstiy Research Institute and the University of Maine Wildlife Department in the Penobscot Bay region and greater Casco Bay imply local osprey declines of 50% and 20%, respectively, in these coastal regions. A baseline study of the lower Penobscot River and estuary will enable critical, future comparisons after fisheries restoration efforts commence in coming years.

Northern Harrier & Short-eared Owl
Both species are ground-nesters and frequent grasslands or extensive marshlands, heaths, etc. If you know or suspect nesting by either species, please notify a MDIFW wildlife biologist. Short-eared owls are now recognized as a "Threatened Species," and northern harriers are a "Special Concern Species" in the state of Maine.

This work is supported by the federal State Wildlife Grants program and state revenues from the Loon Conservation Plate and Chickadee Check-off Funds.

--Charlie Todd

Piping Plovers

Piping plovers are small, sand-colored shorebirds that nest on sandy beaches and dunes along the Atlantic Coast from Newfoundland to South Carolina. Habitat loss, lack of undisturbed nest sites, and predation are the primary factors jeopardizing populations of piping plovers. With less than 2000 nesting pairs on the Atlantic coast the piping plover is federally listed as Threatened and is listed as Endangered in Maine. Maine's population of piping plovers has been monitored annually since 1981. Until recently the overall population trend has been one of increase.

Unfortunately, due to recent habitat loss from devastating spring storms, coupled with higher predation rates and greater presence of unleashed dogs on plover nesting beaches, Maine's piping plover population plummeted from a high of 66 pairs in 2002 to only 24 nesting pairs in 2008. In 2005, Maine piping plovers experienced a dismal nesting season. At 18 different beaches a total of 49 pairs of plovers made 82 nesting attempts but produced only 27 fledglings (0.55 chicks fledged per pair). This was the lowest productivity recorded since 1981, far below the productivity rate needed to sustain the plover population. In 2006, only 40 pairs of piping plovers returned to Maine to nest; nine plover pairs lost entire

broods to predation and all other nests lost one or more chicks to predation. In 2007, piping plover habitats were plagued with a series of damaging spring storms combined with predation and human related disturbances. 2007 was another dismal year as Maine plovers produced only 37 fledglings!

With only 24 pairs of piping plovers returning to nest in 2008 and the realization we were very close to losing this species from our state; municipalities, landowners, government agencies, and private organizations combined efforts to protect nesting piping plovers and attempt to reverse the declining population trend. MDIFW, Maine Audubon, Maine's Bureau of Parks and Lands, Rachel Carson National Wildlife Refuge, USDA APHIS Wildlife Services, The Nature Conservancy, and Bates College have a long-standing collaboration regarding piping plover management. Since the early eighties they have monitored and protected nesting plovers by providing field personnel, negotiating management agreements with landowners, compiling data, and working collaboratively with municipalities on beach management issues.

The towns of Wells, Ogunquit, Old Orchard Beach, and Scarborough are committed to managing their beaches using guidelines established with MDIFW that provide recreational opportunities for beachgoers and still protect plover broods. These towns have included funds in their budgets to hire plover volunteer coordinators. Plover volunteer coordinators recruit and coordinate volunteers who monitor and help protect plover nests and chicks during the nesting season.

Intensive management efforts and dedication by the "plover community" in 2008 saw a reverse in the declining trend of plover productivity. Despite a 17-year low in nesting numbers, breeding success rose and a total of 24 nesting pairs successfully fledged 41 young. In 2011, 33 pairs of piping plovers returned to Maine to nest.

Encouraged by recent successes and a better understanding of factors that limit nesting success, efforts are now underway to achieve even higher productivity rates for plovers in 2011. Management similar to other years will be combined with the following new initiatives:

Establishment of "Natural Beach Areas": Town officials in Ogunquit and Maine's Bureau of Parks and Lands are taking extra steps to assure plover success by designating a small portion of their beaches as a "Natural Beach Area". These areas are left in a natural state, allowing washed up seaweed or "wrack" to accumulate, trapping sand, encouraging beach grass, and providing habitat for plovers. Invertebrates within the wrack are an important food source for fast growing plover chicks and provide cover from predators.

On the Beach Outreach programs: Maine Audubon and Rachel Carson NWR have provided educational programs aimed at beachgoers for several years, however, recently this effort is taking place on the nesting beaches. An outreach booth can be found on various beaches throughout the summer offering information about piping plovers, on-beach games, and opportunities for people to see the birds through a scope.

Law Enforcement: Maine Warden Service wardens will be patrolling beaches in southern Maine throughout the nesting season making sure that beach visitors are respectful of the piping plover nesting areas, and to assure that dog owners keep their dogs on leashes and away from nesting areas.

MDIFW is asking for help from all beachgoers to protect these remarkable birds by observing these simple guidelines:

- Avoid fenced areas marked with "Restricted Area" signs.
- Observe birds and chicks only from a distance, with binoculars.
- Keep pets off the beach or leashed from mid-April to mid-September.
- Don't fly kites near posted areas. They resemble hawks and can keep birds away from nests.
- Take your food scraps and trash off the beach when you leave; it attracts predators such as skunks and raccoons.
- Call the Maine Warden Service to report harassment of birds. It's a federal offense to harm an Endangered Species.

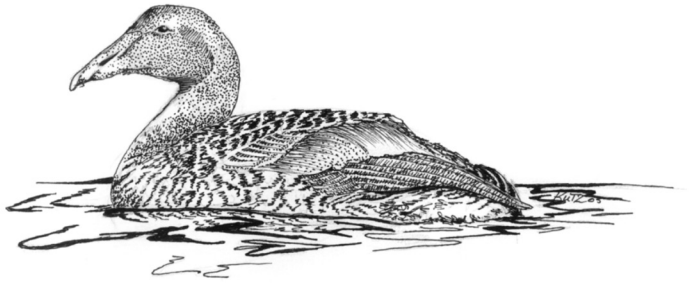
This work is supported by volunteer assistance, the federal State Wildlife Grants program, Section 6 Funding, and state revenues from the Loon Conservation Plate and Chickadee Checkoff Funds.

--Lindsay Tudor

Satellite Telemetry and Common Eiders in Maine

Last spring Department biologists had an opportunity to work on a first-of-its-kind common eider investigation with friends Lucas Savoy and Wing Goodale, two biologists from Gorham, Maine-based Biodiversity Research Institute (BRI). BRI's study was to use satellite telemetry to investigate Common Eider daily habitat use and movements in relation to offshore wind facilities test sites. Currently there are initiatives underway along Maine's coastline and the Atlantic seaboard of the U.S. to expand wind power facilities into the offshore marine environment. Sea ducks, especially eiders, are one of the species whose nesting, migration, and wintering areas can overlap with these wind power operations. Seabirds can be struck and killed by wind turbines. European studies have shown that eiders are also impacted indirectly by marine-wind power development by avoiding the wind-farms and potentially losing otherwise available habitat.

One of the best applications of satellite telemetry is for far-ranging species such as migratory birds. If substantial enough, this information could help inform regulatory agencies and conservation groups involved with advising the wind power industry how to design and locate test facilities and ultimately operational commercial development.



In May 2010, BRI researchers teamed with biologists from IFW and U.S. Geological Survey, to capture and track four common eiders with satellite transmitters. All transmitters were implanted abdominally by an experienced wildlife veterinarian that BRI had hired for this task. Each eider was implanted with a 38gram satellite transmitter. The eiders were held until fully recovered from the procedure. Each bird was returned to her nest. Every three to 5 days since (when the appropriate satellite passes overhead) each transmitter sends a high frequency signal to the satellite. The satellite then calculates the bird's location and relays the information to a receiving site on the ground.

All four birds are currently alive and well, having survived both the hunting season and the winter. While the four birds did not use any of the proposed offshore wind sites in Maine, one spent the entire winter in the vicinity of a proposed wind power site off the coast of Massachusetts. This bird, and two others, spent the winter in Massachusetts waters. The fourth bird surprisingly wintered to the northeast in Stonington, Maine. Following is a brief summary of some of the interesting information collected during this investigation: 3 of the 4 eiders remained within a 4-mile radius of the nesting colony between May and October. These 3 eiders migrated 150 miles south to Cape Cod, Massachusetts beginning in late October; the fourth eider flew 70 miles northeast to East Penobscot Bay. All four eiders showed little movement between daily (foraging) and night (roosting locations. All 3 eiders that wintered in Massachusetts returned to Casco Bay; the first on March 13, the second between March 24-28, 2011, and the third between April 7-9, 2011. The eider that wintered in Stonington returned to Casco Bay on May 15th.

This work is supported by the federal Pittman-Robertson Funds program, the Maine Outdoor Heritage Fund, and revenue from the sales of hunting licenses.

--Brad Allen

Mammal Group

The Mammal Group is one of 4 groups in the Wildlife Resource Assessment Section (WRAS), in the Bangor Office. We develop and oversee the implementation of all management systems for Maine's mammals; address public and Departmental information needs through the development of research programs, monitoring protocols, species assessments, and public presentations; and assist in the formulation of harvest regulations by analyzing biological data, meeting with regional biologists, and making recommendations to the Department's upper administration.

Wally Jakubas, Mammal Group Leader – Supervises mammal group personnel, oversees all group activities, coordinates group activities within and outside of the Department, manages the group's budgets, serves as lead biologist on New England cottontail, wolf, and cougar issues.

Randy Cross, Wildlife Biologist – Supervises bear field crews; assists in analyzing bear data; oversees the processing and aging of moose, deer, and bear teeth; and gives public information talks and demonstrations on bear management activities.

John DePue, Wildlife Biologist – Oversees furbearer and small mammal management, annually reviews and proposes changes to Maine's trapping regulations, designs small mammal surveys, leads New England cottontail field activities and assists in their management, monitors white-nose syndrome in bats, assesses the impact of windpower projects on small mammals, and serves as Departmental spokesperson on furbearer and small mammal issues.

Lee Kantar, Wildlife Biologist – Oversees the management of Maine's white-tailed deer and moose populations, including biological data collection and analysis, formulation of annual season recommendations, and monitoring chronic wasting disease. Lee is the Departmental spokesperson on deer and moose issues.

Jennifer Vashon, Wildlife Biologist – Oversees black bear and lynx programs, including biological data collection and analysis, formulation of annual season recommendations for black bear, providing technical advice on nuisance bear issues, and development and implementation of the lynx management program. Jen also serves as the Departmental spokesperson on lynx and bear issues.

Lisa Bates, Bio Specialist (Seasonal) – Helped coordinate field activities for the lynx research project, including field camp operations, trapping, and chemical immobilization of research animals, and assisting the lynx project leader with data entry and analyses.

2010-11 Contract Workers & Volunteers – **Bear Project:** Michael Ballinger, Lisa Bates, Stephen Dunham, Jared Mitchell, Joseph Roy, Dan Wagner, and Mike Wheeler; **Coastal Marine Otter Project:** Anthony Ryan; **Deer Project:** Holly Bates, Lisa Bates, Jerry Collier, Brittany Currier, Christi Dimon, Philip Dumond, Dan Hansche, Wendall Harvey, Eldon McLean, and Matt O'Neal; **Lynx Project:** Trennan Dorval, Dorothy Fecske, Dan Hansche, Erica Johnson, Kyle Ravana, and Alexej Siren (co-field leader); **Lynx Exclusion Project:** Dave Allen, Josie Allen, and Dana Johnson; **Moose Project:** Rebecca Cunfer; **Muskrat pelts:** Jon DeLisle, Jennifer Jensen, Leewood Oakley, and Melanie Renell; **New England Cottontail Project:** Kelly Boland (NEC Restoration Coordinator), Dan Brubaker, Elizabeth Deletetsky, Dorothy Fecske, Ian Hanley, Wendy Patterson, Toni Weidman, and Tony and Nancy Viehmann.

We deeply appreciate the dedication and hard work we receive from our contract workers and volunteers!

Mammal Conservation and Management

White-tailed Deer

2010 Deer Season Dates and Structure

Maine Deer hunters could hunt white-tailed deer for 79 days within the structure of five different hunting seasons during 2010; expanded and special (October) archery, rifle, muzzleloader, and youth day.

2010 Doe Quotas, Any-Deer Permits, and Applicants

For 2010, doe quotas (the number of does that are predicted to be harvested, given a certain number of any-deer permits, in a Wildlife Management District [WMD]) ranged from 0 in 16 WMDs (districts 1-11, 14, 18, 19, 27, and 28) to 780 does in WMD 23. Among the 13 WMDs in which a doe harvest was desired, a total harvest of about 5,672 does was expected. An expansion factor (the estimated number of permits required to harvest 1 adult doe) is applied to the doe quota to ensure that doe harvest objectives are met for each WMD. After applying the expansion factor, permit levels for 2010

totaled 48,825, representing a 7.5% increase in antlerless deer hunting opportunity compared to 2009 (45,385 permits). Permit allocations ranged from zero in 16 WMDs, to 7,800 permits in WMD 23. The top 5 WMDs receiving Any-deer permits on a per 100 mi^2 basis were WMD 22 (1,277 permits), WMD 24 (1,222 permits), WMD 21 (1,178 permits), WMD 23 (999 permits), and WMD 25 (841 permits). Maine residents drew 33,036 any-deer permits (68%); landowners drew 12,208 permits (25%); nonresidents drew 2,520 permits (5%); Superpack permittees received 1,061 permits (2%). Overall, 64,679 people applied for any-deer permits during 2010 (60,043 residents; 8,389 landowners; 4,138 nonresidents; 1,541 Superpack).

Table 5. Sex and age composition of the 2010 deer harvest in Maine by season type and week statewide.

Season	Sex/Age Class				Total Deer	Total Antlerless Deer
	Adult		Fawn			
	Buck	Doe	Buck	Doe		
Archery	**515**	**662**	**154**	**166**	**1,497**	**982**
Expanded	254	353	83	91	781	527
October	261	309	71	75	716	455
Youth Day	**152**	**167**	**67**	**58**	**444**	**292**
Regular Firearms	**11,043**	**3,962**	**1,120**	**910**	**17,035**	**5,992**
Opening Saturday	1,296	477	156	118	2,047	751
Nov 1-Nov 6	2,508	890	285	220	3,903	1,395
November 8-13	2,626	815	223	188	3,852	1,226
November 15-20	2,354	614	182	142	3,292	938
November 22-27	2,259	1,166	274	242	3,941	1,682
Muzzleloader	**510**	**409**	**68**	**83**	**1,070**	**560**
Nov 29-Dec 4	242	132	26	29	429	187
December 6-11	268	277	42	54	641	373
Crossbow	10	4	1	2	17	7
Total	**12,230**	**5,204**	**1,410**	**1,219**	**20,063**	**7,833**

[1]Records corrected for season omissions
Sex/age data were corrected for errors in the deer registrations

Statewide Statistics for 2010
Overall, 20,063 deer were registered during 2010, of which 1,497; 444; 17,035, and 1,070 were taken during the archery, youth day, regular firearms, and muzzleloader seasons, respectively (Table 5). There were 1,971 more deer harvested in 2010 than in 2009 (18,092 deer vs. 20,063), which represents a 11% increase from the 2009 season.

Buck Harvest
The statewide harvest of antlered bucks (12,272) in 2010 was a 10% increase from the previous year (11,168; Table 6). The top 5 buck-producing (per mi^2 basis) WMDs in 2010 were (in descending order), districts 24, 21, 22, 23, and 20 (excluding 29), all in central and southern Maine. Among the antlered bucks taken in 2010, roughly 5,891 (48%) were 1 ½ year-olds (yearlings) sporting their first set of antlers, while more than 1,718 (14%) were mature bucks (4 ½ to 15 ½ years old). Male fawns are reported as antlerless deer.

Table 6. Sex and age composition of the 2010 deer harvest in Maine by Wildlife Management District[1].

Wildlife Management District	Adult		Fawn		Total Antlerless Deer	Total All Deer
	Buck	Doe	Buck	Doe		
1	60	0	0	0	0	60
2	36	0	2	0	2	38
3	81	0	0	0	0	81
4	73	0	0	0	0	73
5	102	1	0	0	1	103
6	230	5	2	0	7	237
7	334	11	7	2	20	354
8	223	2	6	0	8	231
9	82	1	0	0	1	83
10	76	0	0	0	0	76
11	232	0	2	0	2	234
12	420	101	32	23	156	576
13	283	75	26	18	119	402
14	221	10	6	1	17	238
15	881	447	114	110	671	1,552
16	930	614	174	155	943	1,873
17	1,373	487	156	117	760	2,133
18	223	8	7	2	17	240
19	92	0	0	0	0	92
20	791	452	134	94	680	1,471
21	875	607	151	129	887	1,762
22	708	474	113	105	692	1,400
23	1,080	656	159	181	996	2,076
24	421	273	78	68	419	840
25	813	397	85	74	556	1,369
26	916	345	77	74	496	1,412
27	271	1	0	0	1	272
28	148	1	1	0	2	150
29	297	223	55	60	338	635
Statewide	12,272	5,191	1,387	1,213	7,791	20,063

[1]Sex/age data were corrected for errors in the deer registrations

Antlerless Deer Harvest
The statewide harvest of adult (older than fawn) does during 2010 was 5,200 which was 12% below the pre-set expected goal of about 5,922 adult does, including WMD 29. During 2010, any-deer permittees also tagged 2,155 fawns, while archers and youth day hunters tagged 445 fawns. Overall, 7,800 antlerless deer were registered by hunters during the 2010 season (Tables 5 & 6).

Harvest by Season and Week
In 2010, approximately 85% of the total deer harvest occurred during the 4-week firearms deer season (Table 7). Archery harvest decreased some from the previous year (-17%), while the muzzleloader harvest stayed about the same. The ninth

youth day took place on Saturday, October 23rd. Due to the impacts from the severe winters, youth were relegated to bucks only in buck-only WMDs but maintained either-sex opportunity in WMDs where any-deer permits were allotted.

Harvest By Hunter Residency

Residents tagged 93% (18,566 deer) of the total harvest during 2010 (Table 7). Among seasons, the proportion of the harvest registered by Maine residents was greatest for the archery season (97%) and youth day (97%), followed by the muzzleloader (96%) and firearms (92%) seasons.

Regional differences occurred in the distribution of the harvest by residents and visitors to Maine. In the more populous central and southern WMDs, most successful deer hunters were Maine residents. In 2010, non-residents harvested fewer deer than usual. The proportion of deer harvested by non-resident hunters was highest in WMD 2, along the Canadian border, where 47% of the harvest was by non-residents. At the other end of the spectrum, 99% of the deer taken in heavily populated WMD 21 and 22 (southern Maine) were registered by Maine residents (Table 8).

Table 7. Deer registrations by season type and state-residency of successful hunters, statewide in Maine during 2010.

Season & Week	Deer Registrations By: Residents	Nonresidents	Total	Percent by Residents
Archery	**1,448**	**49**	**1,497**	**97**
Expanded	754	27	781	97
October	694	22	716	97
Youth Day	**432**	**12**	**444**	**97**
Regular Firearms	**15,641**	**1,394**	**17,035**	**92**
Opening Saturday	2,046	1	2,047	100
Nov 1-Nov 6	3,566	337	3,903	91
November 8-13	3,475	377	3,852	90
November 15-20	2,909	383	3,292	88
November 22-27	3,645	296	3,941	92
Muzzleloader	**1,029**	**41**	**1,070**	**96**
Nov 29-Dec 4	407	22	429	95
December 6-11	622	19	641	97
Crossbow	16	1	17	94
Total	**18,566**	**1,497**	**20,063**	**93**

Table 8. Deer registrations by county of kill and county-residency of successful hunters in Maine, during 2010.

County of Kill	Deer Registrations By: Residents	Nonresidents	Total	Percent by Residents
Androscoggin	951	251	1,202	79
Aroostook	418	192	610	69
Cumberland	1,563	438	2,001	78
Franklin	494	280	774	64
Hancock	799	170	969	82
Kennebec	1,815	386	2,201	82
Knox	701	212	913	77
Lincoln	481	92	573	84
Oxford	1,007	562	1,569	64
Penobscot	1,551	469	2,020	77
Piscataquis	269	399	668	40
Sagadahoc	506	244	750	67
Somerset	1,028	658	1,686	61
Waldo	939	561	1,500	63
Washington	377	*77*	*454*	*83*
York	1,923	250	2,173	88
Statewide	14,822	5,241	20,063	74

Hunter Participation and Success Rate

During 2010, 199,666 licenses that permit deer hunting were sold in Maine; of these 88% were bought by residents. Hunter density, therefore, averaged about six per square mile, statewide, and these hunters expended over an estimated 1 million hunter-days effort pursuing deer over Maine's 79 days of deer hunting.

Compared to the regular firearms season that attracts over 170,000 participants, the expanded archery and special muzzleloading seasons attract far fewer hunters. In its 13th year, the expanded archery season attracted just under 9,000 participants (over 90% residents). The sale of special muzzleloading season permits decreased by 13% in 2010 to 15,691 permits.

Deer hunting success (based on total number of estimated hunters and registered harvest) in Maine during the regular firearms season was estimated at 12% in 2010. The success rate for hunters who drew an any-deer permit (range 20%–48%) is typically higher than for hunters who were restricted to "bucks-only" during the regular firearms season (range 7%–22%).

Prospects for the 2011 Deer Season

In 2011, we will offer 5 separate deer hunting seasons in Maine. The expanded archery season will open September 10th and run until to December 10th (79 days). This season is limited to WMDs 24 and 29 (formerly WMD 30 Northeast to Vinalhaven), as well as 9 other locations, primarily in residential-suburban sprawl areas with firearm discharge ordinances. Hunters with a valid archery license may purchase multiple antlerless permits for $12.00 each and one buck permit for $32.00. This amount of bowhunting opportunity is aimed at increasing the harvest of does and fawns in order to meet population density objectives for areas that are difficult to access for hunting. In the expanded archery zone, deer populations can only be reduced if the limited number of archers that can gain access to huntable land are each able to harvest a substantial number of deer.

The regular (statewide) archery season will run from September 29th–October 28th (26 days). Youth day will be Saturday, October 22nd, and is reserved for hunters from 10–15 years-old, who are accompanied by a licensed adult (who is not allowed to carry a hunting weapon). The 25-day regular firearms season opens for Maine residents on Saturday, October

29th, and for nonresidents the following Monday. This season ends the Saturday following Thanksgiving (November 26th). Finally, the muzzleloader season will begin in all WMDs on November 28th, but will end on December 3rd (6 days) in WMDs 1–11, 14, 19, 27, and 28. Elsewhere, the muzzleloading season will continue until December 10th (12 days). Crossbow archery season will coincide with modern firearms. New in 2011, hunters over 70 can use a crossbow during expanded archery.

Availability of any-deer permits among our 29 WMDs is directly related to our deer management objectives. Very conservative doe harvests are required in eastern and northern WMDs where we are trying to increase deer densities. In contrast, does must be harvested more heavily in WMDs where current objectives are to stabilize deer populations near 15 or 20 deer/mi^2. Abundance targets were set following input from a Public Working Group whose task was to formulate Maine's deer management goals.

To accomplish deer management objectives in 2011, we have set doe harvest objectives ranging from 0–630 among our 29 WMDs. Totaling 2,961 does statewide, the 2011 doe harvest objective is 43% below the doe harvest we achieved in 2010. The decreased doe harvest objective in 2011 reflects new information collected on deer abundance from aerial surveys as well as the objective to ensure attaining population objectives in south-central WMDs. A total of 26,390 Any-deer permits will be issued statewide ranging from 170 permits in WMD 13 to 5,670 in WMD 21. No permits will be allocated in WMDs 1–12, 14, 18, 19, 27 and 28.

The allocation of 26,390 any-deer permits, along with the archery and youth seasons, should result in the statewide harvest of roughly 3,000 does and an additional 1,624 fawns in 2011. Antlered buck harvests should approximate 11,515, which is about a 6% decrease from the 2010 buck kill of 12,272. The impact of two tough winters on deer survival is still being felt, however we should see some positive gains in the future with the significant reductions in any-deer permits. If normal hunting conditions and hunter effort take place the statewide deer harvest in Maine should be in the vicinity of 16,650 deer.

This past year has been a busy one for deer research and management. We ended 2010 by flying some new aerial surveys in central Maine WMDs to estimate deer population size. We used a double-count technique developed by deer biologists in Canada to get population density estimates for two WMDs that support any-deer permits. We have funding through an Outdoor Heritage Fund grant to fly a few more surveys but hope to obtain more funds. One goal is to correlate density estimates from aerial surveys to sighting-rates of deer in WMDs as reported by deer hunters. We mail survey forms to potential survey participants each year. In 2011, the MDIFW developed a Game Plan to increase deer numbers in northern, eastern, and western Maine that outlines strategies to address the various limiting factors that are causing deer numbers in those regions to remain suppressed. To find out more about MDIFW's deer-related activities and plans, check out our website at: http://www.maine.gov/ifw/hunting_trapping/hunting/LivingOnTheEdge.htm.

--Lee Kantar

Moose

2010 Moose Season Dates and Structure

Maine moose hunters could hunt moose for 6 days per season by permit within the structure of a split season framework (September/October/November) during 2010. The September season ran from September 27th to Oct. 2nd, while the October season ran from the 11th through the 16th. For the first time a 3rd week in the north country (WMDs 2, 3, 6, and 11) occurred from Nov. 1 through Nov. 6. In addition, 2010 marked the third November moose hunt in Department history (covering southern Wildlife Management Districts [WMDs] 15, 16, 23 and 26). The season ran concurrent with the November deer season from November 1st to November 27th and opened for Maine residents on October 30th.

Moose Permits and Applicants

The annual allocation of moose permits is dependent on the management goals for each WMD. Moose management goals are categorized as either recreational, compromise, or road safety. Permit levels changed in several management areas between 2009 and 2010 including the overall management strategy of WMD 2 that was changed from a recreational to compromise zone. Both WMDs 18 and 19 had a decrease in bull permits by 10 each, while WMDs 27 and 28 had antlerless permits reduced to zero. Because of the strategy change in WMD 2, both bull and antlerless only permits were increased, with 125 antlerless permits allocated and an additional 30 bull permits. Lastly, we decreased bull permits in WMD 3 by 25, due to concerns over the bull composition, and increased antlerless permits by 60 to decrease the overall population. The Southern Maine moose hunt in WMDs 15, 16, 23, and 26, provided an additional 135 any-moose permits. Any-moose permits allow the permittee to harvest either a bull or cow. The total number of moose permits issued in 2010 was 3,140.

During 2010, Antlerless Only Permits (AOPs) ranged from zero in 8 WMDs (districts 4, 5, 7-9, 14, 27 and 28) to 290 in WMD 3. Among the 18 WMDs in which a cow harvest was desired, the permit allocation totaled 945. The number of AOPs allocated in a given district reflects that WMD's moose cow harvest objective. Consequently, WMDs that can sustain only limited cow mortality are allocated relatively few antlerless permits. In contrast, WMDs that can

support higher cow mortality (and still meet management objectives) are allocated more permits (such as, Road Safety Management WMDs). The southern Maine WMD moose hunt is a slight variation on this. Permit type was structured as any-moose and the season was extended to the length of the November deer season to increase the chances of a hunter harvesting a moose within a district where densities are low and landowner access can be difficult. The November time frame was chosen to honor recommendations by landowners who wanted the southern Maine moose season to open and run concurrently with the November firearms season for deer.

Permits are allocated to qualified applicants in a random computerized lottery. Maine residents can purchase additional chances in the lottery as follows: one chance for $7.00, three chances for $12.00 and, six chances for $22. Non-residents can increase their odds as follows $15.00 = one-chance, $25.00 = three-chances, $35.00 = six-chances, $55.00 = ten-chances. In addition, nonresidents may purchase multiples of 10 chances at $55.00 each. No more than 10% of the total permits for each WMD can go to non-residents. Upon selection, resident and non-resident permit fees are $52.00 and $477.00 respectively. Overall, 49,729 people applied for a moose permit during 2010. This included 37,012 residents and 12,217 non-residents. Out of those applicant pools 7.7% of the residents and 2.4% of the non-residents were selected for permits.

Statewide Statistics for 2010
Overall, 2,397 moose were registered during 2010 (Table 9). Since the re-institution of moose hunting in 1980, moose season timing (split season started in 2002) and areas open to hunting have changed several times.

Bull Harvest
The statewide harvest of bulls during the Sept/Oct/Nov season (1,680) in 2010 marked a 3% decrease from the previous year (1,739). Among the antlered bulls taken in 2010, roughly 182 (11%) were 1 ½ year-olds (yearlings) carrying their first set of antlers, while 294 were 2.5 years-old, making up 19% of the bull harvest. Mature bulls (4 ½ to 14 ½ years old) comprised 57% of bulls older than 2.5.

Breeding bulls can lose an average of approximately 15% of their body weight during the rut. Because of this and the timing of the fall harvest, bull weights reflect a decrease in body weight from September to October. Average bull weights (all age classes) in the 2010 harvest for September were 725 pounds versus 673 pounds in the October harvest (>7% decline). The heaviest bull weighed in at 1,192 dressed (no digestive tract, heart, lungs, or liver) and was taken in WMD 3 during the September season. The largest antler spread was 65 inches on a 7.5 year-old bull harvested in WMD 11. Two bulls with the highest number of antler points (32) were recorded in WMD 7 and WMD 3. Among 1,561 bulls examined in the harvest, 17% of the bulls sported cervicorn antlers (antlers without a defined palm) and 53% of these moose were yearlings; 10% were mature bulls (>4 years-old), including the oldest at 12.5 yrs-old.

Antlerless Harvest
The statewide harvest of adult (yearling and older) cows during 2010 was 622 compared to 516 in 2009 (21% increase). During 2010, antlerless-only permittees also tagged 66 calves that included 24 males and 42 females. Overall, 717 antlerless moose were registered by hunters during the 2010 season. This increase included the antlerless moose taken as part of the 135 Any-moose permits issued within the southern zones. The antlerless moose harvest in the southern zones was comprised of 12 adult cows and two bull calves.

Harvest by Season and Week
Maine's moose hunting was split into two seasons (i.e., September and October) from 2002–2007. In 2008 the southern Maine moose hunt added the month of November to the program. Now, a hunter is issued a permit for one of four seasons and can hunt for a maximum of 6 days during September or October or November, or during the entire firearms deer season in WMDs 15, 16, 23, and 26.

Hunter Participation, Residency and Success Rate
In 2010, 2,832 residents and 308 non-residents won permits to hunt moose. A total of 308 non-residents hunted for moose across all open WMDs with a 100% success rate. Representing 36 states (as far away as Oregon) and 4 provinces (New Brunswick, Nova Scotia, Ontario and Quebec), the greatest percentage of non-resident hunters came up from Massachusetts (13%). Resident success rates were 79%, and when combined with the outstanding success by out-of-staters, the total success rate was 77% statewide (excluding southern ME-November season). Success rates over the last 9 years have been around 79%.

Changes for the 2011 Moose Season
In 2011, we will offer 4 separate moose hunting periods in Maine; September, October and November. The September season will run from September 26th to October 1st in WMDs 1–6, 11 and 19. The October season will run from October 10th through the 15th and include WMDs 1–14, 17–19, 27, and 28. The northern November hunt in WMDs 1–8, and 11 will occur from the 7th–12th. In WMDs 15, 16, 22, 23, 25 and 26, the November season will coincide with November's deer season running from October 31st through November 26th. Opening day for Mainers will be on Saturday October

Table 9. Moose Harvest and Success Rates by Wildlife Management District and Season for 2010 in Maine.

							PERMITS			SUCCESS		
	WMD	Bull	Cow	Bull Calf	Cow Calf	Total Antlerless	Total	BOP	AOP	Total Permits	BOP	AOP	Total
SEPTEMBER	1	79	4			4	83	92	5	97	0.86	0.80	0.86
	2	77	30	2	3	35	112	80	45	125	0.96	0.78	0.90
	3	94	59	1	2	62	156	101	100	201	0.93	0.62	0.78
	4	181	1			1	182	192		192	0.94		0.95
	5	83					83	96		96	0.86		0.86
	6	107	30	1	4	35	142	122	74	196	0.88	0.47	0.72
	11	50	12		1	13	63	78	30	108	0.64	0.43	0.58
	19	33	1		1	2	35	61	10	71	0.54	0.20	0.49
	Total	704	137	4	11	152	856	822	264	1,086	0.86	0.58	0.79
OCTOBER	1	23	14	1		15	38	30	15	45	0.77	1.00	0.84
	2	35	39	4	1	44	79	35	44	79	1.00	1.00	1.00
	3	51	69	2	4	75	126	52	96	148	0.98	0.78	0.85
	4	53					53	65		65	0.82		0.82
	5	29					29	32		32	0.91		0.91
	6	51	63	2	3	68	119	56	86	142	0.91	0.79	0.84
	7	104					104	126		126	0.83		0.83
	8	197					197	238		238	0.83		0.83
	9	46					46	51		51	0.90		0.90
	10	65	7		1	8	73	101	10	111	0.64	0.80	0.66
	11	35	24			24	59	50	41	91	0.70	0.59	0.65
	12	18	10	2	3	15	35	35	20	55	0.51	0.75	0.64
	13	26	2		1	3	29	36	10	46	0.72	0.30	0.63
	14	27					27	35		35	0.77		0.77
	17	14	8	2		10	24	30	32	62	0.47	0.31	0.39
	18	30	10	1		11	41	73	20	93	0.41	0.55	0.44
	19	15	4		1	5	20	20	10	30	0.75	0.50	0.67
	27	7					7	25		25	0.28		0.28
	28	26					26	36		36	0.72		0.72
	Total	852	250	14	14	278	1,132	1,126	384	1,510	0.76	0.72	0.75
NOVEMBER	2	10	27	1	1	29	39	10	35	45	1.00	0.83	0.87
	3	43	78	3	5	86	129	50	100	150	0.86	0.86	0.86
	6	47	82	6	6	94	141	50	125	175	0.94	0.75	0.81
	11	21	25	1	7	33	54	35	50	85	0.60	0.66	0.64
	Total	122	212	10	19	241	363	145	310	455	0.84	0.78	0.80
COMBINED	1	102	18			18	120	122	20	142	0.84	0.90	0.85
	2	123	96	6	5	107	230	125	124	249	0.98	0.86	0.92
	3	188	206	6	11	223	411	203	296	499	0.93	0.75	0.82
	4	234					234	257		257	0.91		0.91
	5	112					112	128		128	0.88		0.88
	6	205	175	9	13	197	402	228	285	513	0.90	0.69	0.78
	7	104					104	126		126	0.83		0.83
	8	197					197	238		238	0.83		0.83
	9	46					46	51		51	0.90		0.90
	10	65	7			7	72	101	10	111	0.64	0.70	0.65
	11	106	61	1	8	70	176	163	121	284	0.65	0.58	0.62
	12	18	10	2	3	15	33	35	20	55	0.51	0.75	0.60
	13	26	2			2	28	36	10	46	0.72	0.20	0.61
	14	27					27	35		35	0.77		0.77
	17	14	7		1	8	22	30	32	62	0.47	0.25	0.35
	18	30	15			15	45	73	20	93	0.41	0.75	0.48
	19	48	5			5	53	81	20	101	0.59	0.25	0.52
	27	7	2			2	9	25		25	0.28		0.36
	28	26	6		1	7	33	36		36	0.72		0.92
	Total	1,678	610	24	42	676	2,354	2,093	958	3,051	0.80	0.71	0.77
NOV SOUTH	15	8	5	1		1	15		25	25		0.60	0.60
	16	9	4	1			14		21	21		0.67	0.67
	23	6	1				7		45	45		0.16	0.16
	26	4	2			1	7		45	45		0.16	0.16
	Total	27	12	2		2	43		136	136		0.32	0.32

29th. The month-long November hunt in southern Maine will include for the first time WMDs 22 and 25 for a total of 200 permits allocated for any moose (bull, cow or calf). In total, Maine's moose hunt will offer 3,862 permits for 2011.

With consultation from neighboring Canadian provinces, the Wildlife Division executed a new aerial survey technique to estimate moose abundance in three northern WMDs this past winter. Early results are promising and seem to correlate well to hunter-sighting surveys by WMD. The new surveys could lead to an increased population estimate, and along with other data being collected such as teeth for ages and ovaries for reproductive rates, we are building improved population models that could possibly support increased harvest in the future. We hope to expand population surveys to more WMDs across the range of moose densities in Maine if more funding can be obtained. We are also trying to examine the effects of parasitism on moose (such as ticks, lungworm, bacteria, etc.), but funding is also limiting those efforts.

This work is supported by volunteer assistance, the federal Pittman-Robertson Funds program, revenue from the sales of hunting licenses, and a grant from the Outdoor Heritage Fund.

--Lee Kantar

Black Bear

The expansive forest of northern, eastern, and western Maine supports the largest black bear population in the eastern United States. Because Maine's forest is dense and bears are more common in rural northern and eastern Maine, people rarely see bears. Historically, bears were considered a pest and indiscriminately hunted. Today, black bears are valued by hunters, outdoor enthusiasts, and the general public. Because conflicts can still occur, our management approach strives to conserve bears and provide viewing and hunting opportunities, while minimizing conflicts with people. For more than 35 years, the Department has been committed to conserving Maine's black bear population and has monitored bears in 3 different study areas to ensure our management decisions are based on current and sound information. Recently, we began an effort to update and improve our bear population estimates by equipping a sample of bears with GPS collars. Each collar provides us with data on a bear's locations throughout the year that helps us assess the importance of different habitats to bears and estimate the number of bears that this habitat is supporting. We are also evaluating other techniques that may help us monitor Maine's bear population more efficiently. One method requires hunters to submit a tooth from the bear they harvested. These teeth allow us to determine how old each bear is and reconstruct the populations of past years. For example, a 10-year old bear harvested in 2010 was alive for the preceding 9 years and can be added to the population estimate for the preceding 9 years. We repeat this process for each bear. After several years of collecting teeth, we have sufficient information to estimate the number of bears previously present in the population. Although this method provides an estimate of the number of bears, it is also can be used to monitor whether the population is increasing, decreasing, or stable.

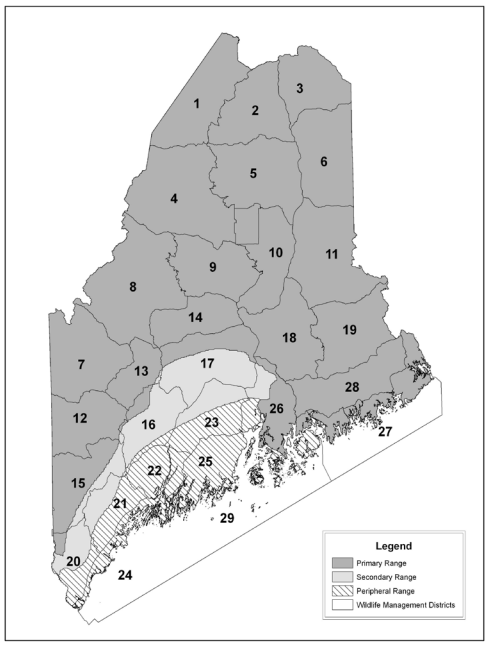


Figure 1. Maine Black Bear Range.

Living with Black Bears

It is the abundance of forest, fields, lakes, coast, and wildlife that make life in Maine enjoyable. In fact, more than 90% of Maine is forested which has allowed Maine's bear population to thrive. Despite a large population of bears, conflicts between people and bears are relatively few. However if you live in a community that is experiencing problems with bears, this often doesn't seem the case. Every spring, bears emerge from their winter dens hungry, and in their search for food, some bears encounter food odors that attract them to back yards, communities, and agricultural fields. Once berries begin to ripen in early summer, bears return to the woods and fields to forage. As a result, we receive fewer complaints of bears attracted to human food sources later in the summer and fall. The most common complaint we receive each spring involves bears at people's bird feeders and in their garbage. Although it may seem easy just to move or remove the bear, if you don't eliminate food odors, bears will continue to visit your backyard each year. All of us can continue to enjoy living in Maine by taking a few simple steps each spring to reduce bear encounters in our back yards and fields.

Remember, if your neighbors are not taking these steps as well, then bears may continue to frequent the area.

- Bring your bird feeders in by April 1st and do not resume feeding birds until late fall.
- Store bird seed in a secure location and remove waste seed from the ground.
- Keep your garbage secure in a building.
- Bring your trash to the curb on the morning of pick-up, not the night before.
- Keep dumpster lids secure and if a dumpster is overflowing with garbage, call the disposal company and have the waste removed.

- Keep pet and livestock feed in a building or other secure enclosure.
- Clean or burn off outdoor grills to reduce food odors; if possible, store the grill in a building when not in use.
- Use electric fence around bee hives and avoid setting hives close to forested edges.
- When possible keep livestock and poultry indoors at night.

Because trapping and moving bears provides a quick fix to a problem and is perceived as a humane response, many people expect the Department to move bears that are around backyards, communities, agriculture, and livestock. However, trapping and moving a bear is not always appropriate; it is costly, and bears that are trapped and transferred to a new area often do not stay. These bears can cause additional conflicts by eventually returning to the problem area and are at greater risk of mortality (encounter more roads, other bears, and people). Because moving a bear immediately resolves the problem, it may be appropriate to remove a bear whose behavior risks human safety or when substantial damage has occurred. However, after the bear is removed, attractants must be removed or secured to prevent future problems. The best solution is for individuals and communities to proactively avoid attracting bears and other wildlife to their backyards and fields by removing food and attractants. To learn more about what you can do to minimize conflicts with bears visit www.bebearaware.com.

The 2010 Black Bear Hunting and Trapping Season

The Department's management of Maine's black bears includes regulating the harvest by setting the season length, bag limit, and legal methods of hunting; requiring that hunters report their harvest; and monitoring harvest levels. The Department can make adjustments to these regulations as needed to meet Maine's bear harvest objectives.

Currently, hunters are allowed to harvest one bear during the fall using a variety of methods. The general hunting season for black bears opens the last Monday in August and closes the last Saturday in November. Hunters are allowed to hunt bears near natural food sources or by still-hunting throughout this 3-month period. Hunting bears over bait is permitted for the first 4 weeks and with the use of hounds for a 6-week period that overlaps the last 2 weeks of the bait season. Trappers can harvest a bear in September and October.

Despite a long stalking and still-hunting season, most bears in Maine are harvested over bait. In 2010, 81% of the bears were taken over bait, 12% with hounds, 2% by still-hunting or stalking, and 3% in traps. More bears were harvested in Aroostook County than any other county (29% of the harvest). Few bears were harvested in central, southern, and coastal Maine (i.e., Knox, Lincoln, Waldo, Androscoggin, Cumberland, Sagadahoc, Kennebec, and York counties) where bear populations are relatively sparse.

Although the 2010 harvest of 3,062 bears is lower than last year's harvest of 3,486 bears, it exceeded the previous 4 year harvest (2,659-2,879 bears). The number of hunters pursuing bears this fall is similar to recent years. Thus, the early abundance of fall foods for bears was likely responsible for the lower harvest in 2010 as hunters and guides reported fewer bears visiting bait sites. Non-resident hunters continue to enjoy hunting bears in Maine with more than half the bear permits sold to non-residents in 2010. Although non-resident permit holders account for half of Maine's bear hunters, they continue to harvest about 2/3 of the bears. While most non-resident hunters hire a guide, few resident bear hunters hire

Table 10. Number of bears harvested in Maine in 2010 by Wildlife Management District (WMD).

	Method of Take								
WMD	Hunting with Bait	While Deer Hunting	Hunting with Dogs	Trapping	Unknown	Total Harvest	Assisted by Guide	Resident	Non-resident
1	130	0	8	0	4	**142**	128	14	128
2	103	0	22	2	0	**127**	115	15	112
3	138	0	13	2	7	**160**	124	41	119
4	232	0	1	1	2	**236**	190	50	186
5	136	0	8	0	1	**145**	130	21	124
6	162	3	16	5	10	**196**	127	67	129
7	85	1	8	7	4	**105**	61	39	66
8	189	2	23	19	3	**236**	139	124	112
9	70	0	2	0	2	**74**	42	30	44
10	121	1	5	2	3	**132**	102	37	94
11	226	1	36	4	6	**273**	189	68	204
12	115	6	37	5	2	**165**	82	90	75
13	35	5	27	2	1	**70**	36	35	35
14	71	1	16	4	3	**95**	59	42	53
15	44	15	17	4	5	**85**	14	68	17
16	3	1	3	1	0	**8**	5	5	3
17	56	9	26	3	2	**96**	18	79	17
18	188	3	9	4	3	**207**	99	117	90
19	97	1	33	2	2	**135**	101	29	106
20	9	6	1	0	0	**16**	0	15	1
21	1	0	0	1	0	**2**	0	2	0
22	0	1	0	0	0	**1**	0	1	0
23	4	1	0	0	0	**5**	0	5	0
24	2	0	0	0	0	**2**	0	2	0
25	2	0	0	0	0	**2**	1	1	1
26	54	4	0	3	11	**72**	10	62	10
27	47	2	3	4	0	**56**	18	34	22
28	117	3	35	9	5	**169**	72	75	94
29	42	1	3	3	1	**50**	24	31	19
State Totals	**2,479**	**67**	**352**	**87**	**77**	**3,062**	**1,886**	**1,199**	**1,863**

guides, which may account for the higher success rate of non-resident hunters. In 2010, non-resident hunters harvested the majority of bears taken during the bait (65%) and hound seasons (61%). Hunting over bait is also the most popular method for resident bear hunters, and accounted for 73% of the bears harvested by Maine residents. In 2010, Maine residents harvested the majority of the few bears taken during the firearms season for deer (88%) and by trapping (85%).

Non-resident hunters became more interested in hunting black bears in Maine following the closure of the spring bear hunt in Ontario in 1999. Their interest remained high until 2003 when a rise in permit fees lowered participation by both non-resident and resident hunters (resident $5.00 to $25.00 and non-residents from $15.00 to $65.00). The down-turn in the U.S. economy has likely contributed to recently reduced bear-hunter participation, especially among non-residents. If hunter participation continues to decline, we may need to increase hunting opportunities to meet bear management goals.

Prior to 2008, trappers and non-resident deer hunters were not required to purchase a bear permit to harvest a bear later in the season. Funds from this new late-season permit are dedicated to bear research and management. Currently we are using these funds to collect teeth from harvested black bears to monitor the age structure of Maine's bear population and trends in bear numbers. Since 2008, between 1,097 and 1,304 late season bear permits were sold. Even with the addition of these permits, hunter participation remained around 11,000.

This work is supported by volunteer assistance, the federal Pittman-Robertson Funds program and revenue from the sales of hunting and trapping licenses.

--Jennifer Vashon

Canada Lynx

The lynx is a medium-sized cat and can be distinguished from a bobcat by its completely black-tipped tail, longer ear tufts, and larger paws. Lynx populations are influenced by the numbers and distribution of snowshoe hare -- their primary prey. Maine is at the southern extent of the lynx range where forests transition from spruce-fir to hardwood and where winter snow depths lessen. Compared to historic records, snow-track surveys initiated in 2003 indicate that lynx distribution has not changed substantially over the last 100 years. Lynx remain common north of Moosehead Lake and west of Route 11, rare in eastern and western Maine, and absent from the remainder of the state. Canada lynx are a federally threatened species, and Maine is home to the only known breeding population of Canada lynx in the eastern U.S. However, recent observations of lynx in Vermont and New Hampshire suggest that lynx may be returning to former parts of their range.

A History of Lynx in Maine

Snowshoe hare are most numerous in young stands of spruce and fir and forests with a dense understory of young conifers. Historically, it appears that lynx persisted in low numbers with brief periods of abundance. Lynx were likely more common in the mid-1800s following the first major spruce budworm outbreak and commercial harvest of spruce- fir forests. As the forest matured, lynx again became less common. By the late 1970s, mature spruce and fir reached record levels, which helped trigger another major budworm outbreak. The extensive clearcutting that followed created record levels of quality lynx and hare habitat by the late-1990s, and much of it persists today.

Although once considered vermin, lynx have been protected from harvest since 1967 when the statewide bounty and hunting and trapping seasons on lynx were closed. In 1997, MDIFW designated lynx as a 'species of special concern' in Maine. This designation is given to species that may become endangered or threatened in Maine and thus warrant special attention and management to prevent future status as a 'listed' species. At a national level, the U.S. Fish and Wildlife Service (USFWS) listed lynx as a threatened species in 14 states, including Maine, in 2000. Although federally listed, lynx have not met the State's threatened or endangered listing requirements. Information gathered from snow-track surveys and telemetry studies in northern Maine during the past decade were critical in making this determination; this information was not available at the time lynx were federally listed. In 2005, the USFWS drafted a recovery outline for lynx that serves as an interim guide for recovery, and in 2009, the USFWS designated 9,500 mi2 of private forest in northern Maine as habitat critical to lynx recovery.

As a threatened species, lynx are protected from intentional and accidental harassment (take) that may or may not result in the direct death of a lynx. The Department and the USFWS have been working on minimizing potential takes of lynx in Maine. In 2008, the Department submitted an incidental take plan (ITP) that would allow a low level of incidental take of lynx by fur trappers by providing strategies to minimize the accidental catch of lynx in traps to the maximum extent practicable. The Department has already implemented many of the measures in the ITP. Currently, the USFWS is planning on publishing Maine's incidental take plan this fall in the federal register.

Research and Management

Biologists at MDIFW have been in the process of building a lynx management system that involves collecting field data, analyzing those data, getting input on management goals, and developing a management system. The process started in the winter of 1999, with the first radio-telemetry study of Canada lynx in Maine. After 12 years of researching lynx in northern Maine, the Department removed radiocollars from lynx and shifted our focus to applying information from

this study to the development of management and conservation strategies for lynx. An assessment of lynx habitat and population levels in Maine has been drafted. This document will help guide future management decisions.

In the last 12 years, Department wildlife biologists have captured and marked 87 lynx and documented the production of 109 kittens on a study area in northern Maine. Notably, after a 2-year hiatus, collared lynx on the study area produced kittens again. In 2010, we documented 12 kittens in 5 litters. This past winter, we observed 11 of the kittens with their mothers indicating that at least 11 had survived. This study allowed Department biologists to assess habitat selection of lynx, the overall quality of the habitat measured by the ability of lynx to survive and produce kittens, and how much area a lynx regularly uses. Data from this study have shown that lynx and snowshoe hares thrive in the regenerating thickets of spruce and fir following logging and that lynx can exist at high densities in northern Maine when this ideal habitat is common. Stands of mature spruce and fir may benefit lynx as potential travel, resting, and denning areas, or even foraging habitat where understories are dense enough to support snowshoe hare.

Over the last decade, Maine's lynx population reached record numbers following the spruce budworm outbreak and extensive salvage logging of spruce-fir forest that followed in the 1970s–80s. Although beneficial to lynx, a habitat management goal that emulates these conditions is not desirable since this level of cutting was not sustainable. The abundance of young spruce and fir will likely cause similar boom/bust dynamics for lynx. Efforts to even-out the age distribution of Maine's spruce and fir may dampen the decline. Therefore, we recommend forest management activities that promote a sustainable level of dense young spruce and fir dispersed across the forested landscape.

Although, future sustainable management of northern Maine's spruce/fir forest cannot produce similarly high levels of snowshoe hare and lynx habitat, it can result in a more stable lynx population. Forest management that maintains connected patches of dense to moderately dense young spruce/fir will benefit hare and lynx. Conversely, forest management in spruce/fir stands that does not promote moderate to dense regeneration of spruce and fir may be detrimental to lynx.

Lynx have a competitive advantage over other predators in deep snow. Climate models have predicted a wetter northeastern U.S. now and in the future. Predictions of winters with more rain could cause lynx range to retract northward. Conversely, more snow could help secure the immediate future of lynx in Maine. Regardless of climate change, Maine's lynx population may never again be as numerous as it is now. Thoughtful planning and continued monitoring is needed to potentially document a reduced, but more stable, population of lynx in northern Maine.

This work is supported by volunteer assistance, federal Section 6 funds, the State Wildlife Grants program, and the Pittman-Robertson Funds program, state revenues from the Outdoor Heritage Fund, Loon Conservation Plate, Chickadee-Checkoff, the sales of hunting and trapping licenses, and the Maine Cooperative Forest Research Unit.

--Jennifer Vashon

Furbearers and Small Game Mammals

Furbearers include all mammals harvested primarily for their pelts. In Maine, these include coyote, red and gray fox, bobcat, fisher, marten, raccoon, skunk, short- and long-tailed weasels, mink, otter, beaver, muskrat, and opossum. The pelts of all furbearers, except weasel, raccoon, muskrat, skunk, and opossum are tagged for tracking the furbearer harvest. Pelt tagging is one of the primary population indices used in our furbearer management systems. Furbearers are primarily trapped but some species (i.e., fox, coyote, bobcat, raccoon, and skunk) are also hunted. Small game that can be hunted includes snowshoe hare, gray squirrel, woodchuck, porcupine, and red squirrel.

Overview of Trapping Season

The heavy snows held off during the fall trapping season, allowing trappers ample opportunity to pursue Maine's furbearer resource. Statewide harvest for most species was average to slightly above average, except for beaver, which had a low harvest (Table 11). The low beaver harvest was likely due to low pelt prices that were the lowest they have been in Maine in the past seven years.

Table 11. Harvest of furbearing animals in Maine. Harvest records are from pelt-tagging records collected from the 2003-2004 to 2010-2011 trapping seasons. Pelt-tagging records may under-represent the harvest of coyote and beaver.

Species	10-11	09-10	08-09	07-08	06-07	05-06	04-05	03-04
Beaver	6,976	10,765	9,119	6,357	12,635	11,094	10,436	8,222
Bobcat	305	281	407	410	344	344	376	273
Coyote	1,623	1,743	1,901	1,819	1,521	2,077	2,175	2,459
Fisher	1,207	1,078	1,456	993	1,968	1,810	2,174	2,526
Red fox	922	932	893	1,030	1,245	1,067	1,413	1,535
Grey fox	332	250	163	161	107	67	125	196
Marten	3,559	2,613	2,291	2,401	2,350	3,873	2,248	5,088
Mink	1,926	1,465	1,297	1,888	2,280	1,108	1,224	904
Otter	754	696	528	493	968	1,041	1,113	931

Harvest trends are one index to track furbearer populations, and a few trend observations of interest in Maine's furbearer harvest data include:

- The bobcat harvest appears to have stabilized.
- In general the coyote harvest continues to decline since the 2001-2002 season.
- Statewide fisher harvest appears to be stabilizing after the institution of a 10 fisher bag limit. However there are several WMDs that continue to experience declines in the fisher harvest; we will be watching these districts closely.
- The grey fox harvest has increased over the past few years to the highest harvest on record in Maine this past season. The increase in harvest may indicate population growth and range expansion.
- The marten harvest this season was the highest we have seen in five years. Historically the marten harvest trends alter between low and high harvest annually, following beech nut production. However, based on the cycle, this past season should have been a low harvest year. The cycle does not appear as stable in recent years, and it could be tied to less predictable beech-nut production. We are looking for ways to collect more data, and implementing new field-survey techniques could allow us to get a better understanding of marten populations and harvest trends.

Muskrat Pelt Data
For the second consecutive year we collected biological data from muskrat pelts and trapping effort data from trappers at the Dixmont fur auction. This year we looked at over 1,400 muskrat pelts; 102 adult females, 330 juvenile females, 213 adult males, 736 juvenile males. On average, it took trappers 13 trap nights to capture 1 muskrat (one trap night is equal to one trap set for one night). It took 32% less effort to catch a muskrat in 2010 than it did in 2009. In 2010, 3.4 juveniles were captured per 1 adult, whereas in 2009, 2.9 juveniles were captured per 1 adult. These data suggest that there may have been in increase in juvenile production or survival during the 2010 season compared with the 2009 season. During the 2010 season, 2 male muskrats were captured per 1 female. There are limitations to what these data can tell us, but this index could provide important information for muskrat management in the future. With more data in the coming years we will be able to make comparisons between seasons, which may shed light on the question of what factors are influencing our muskrat populations. Thanks to all the trappers that allowed us to count their muskrats and a special thanks to the Unity College students for their great help counting muskrat pelts.

Lynx Exclusion Device Testing
Much of the prime marten and fisher habitat in Maine overlaps with lynx habitat. Fisher and marten are pursued by trappers and managed by MDIFW for their harvest in areas that lynx might exist. In an effort to reduce or eliminate incidental lynx captures during the recreational furbearer trapping season, and to provide another tool for trappers to target fisher and marten, MDIFW worked with trapper Dana Johnson to develop a device that would exclude lynx from accessing body-gripping type traps (also called conibear traps) set for fisher or marten. The exclusion device is essentially a rectangular cage that surrounds a conibear trap. The device has one small opening on one end where the target animal can enter but is not large enough and is positioned such that it excludes lynx from reaching the trap.

Exclusion devices were first tested at the Maine Wildlife Park to observe lynx behavior and ensure they could not reach the bait placed in the trap area of the device. This past winter and spring we deployed nine lynx exclusion devices in two areas known to have resident lynx from 24 February through 10 April. Conibear traps were placed in the device as if set for fisher or marten, but the traps were wired open . Each device was monitored by an infrared-triggered trail camera that took videos of animals visiting the trap. Traps were set and baited to attract lynx.

Four of the nine devices were visited by lynx. Because lynx were not marked, we do not know how many individuals visited the traps. However, based on date and time of lynx visits, at least three individual lynx investigated the devices. Lynx spent over 6 hours at the devices investigating the traps, digging at the back of the trap, and pulling on the device trying to get the bait. Lynx were not able to access the trap within the device, and no lynx attempted to put its paw into the opening. Instead, lynx were primarily focused on the back of the trap where the bait was. The Department has proposed regulations that would allow trappers to use these devices on the ground, in WMDs 7, 14, 18, and 19, where lynx are known to occur, and conibear sets on the ground were prohibited by MDIFW in 2010 to avoid accidental capture of lynx.

This work is supported by volunteer assistance, the federal Pittman-Robertson Funds program, revenue from the sales of hunting and trapping licenses, and funds from Loon Conservation Plate.

--John DePue

White-nose Syndrome in Bats

White-nose syndrome (WNS) is a disease that affects winter hibernating bats and is associated with a newly discovered fungus, *Geomyces destructans*. The disease was named white-nose syndrome because when first discovered, infected bats had white fungus on their muzzles. WNS was first documented in New York in 2006 and has since spread through out the Northeast and Canada. WNS causes hibernating bats to awaken more often during hibernation and prematurely use up fat reserves needed to survive the winter. It is estimated that WNS has already killed more than 1 million bats in the Northeast.

To date there have been no known human-illnesses attributed to WNS. Scientists are still learning about WNS but the fungus lives in cold damp environments, and we know of no risk to humans from contact with infected bats.

Surveys for WNS conducted at hibernacula in Maine in 2009 and 2010 found no evidence of WNS. Unfortunately during 2011 surveys, MDIFW biologists found bats at two sites in Oxford County with visible sings of WNS fungus on their wings and muzzles. Carcasses collected from one of the sites were sent to the USGS-National Wildlife Health Center in Madison, WI for diagnostic evaluation for WNS; bat carcasses tested positive for WNS. MDIFW is partnering with other state and federal agencies, and non-governmental organizations to monitor bat populations by pre and post pup-rearing surveillance and maternity emergence counts. Some formerly common species are likely to be listed as state and federally endangered in years to come.

This work is supported by volunteer assistance, the federal State Wildlife Grants program, and state revenues from the Loon Conservation Plate and Chickadee Checkoff Funds.

--John DePue

New England Cottontail

The New England cottontail (NEC; *Sylvilagus transitionalis*), or cooney, is Maine's only endangered terrestrial mammal, and is a candidate for listing under the federal Endangered Species Act. It is the only wild "rabbit" in southern Maine that stays brown during the winter. The decline in the NEC population has been attributed to habitat loss, in particular, the loss of old fields and shrubby habitat. Most people have a hard time believing that an animal that "breeds like a rabbit" could become endangered. The fact that a species with a high reproductive rate like the NEC is endangered begs the question -- if New England's only native cottontail is endangered, what does it say about the status of other wildlife that live in brushy / early successional habitats or the health of the ecosystem in which they live? Today, NEC only occupy about 20% of their former range and exist in three known populations in Maine: 1) Cape Elizabeth / Scarborough, 2) Wells, and 3) Kittery/York/Elliot. These populations are not only separated by distance but by a landscape fragmented with roads and unsuitable habitat. Landscape fragmentation and the physical distance between NEC populations prevent NEC from moving between populations. As a result, there is very little gene flow among Maine's cottontail populations. Consequently, Maine's NEC populations are losing their genetic diversity and have a high risk of becoming extirpated (locally extinct), unless management actions are taken. Under Maine's Endangered Species Act killing or harassing NEC is illegal, with a permit.

Our Department is working closely with governmental and non-governmental organizations to try to restore Maine's NEC population and the habitats in which they live. Our current focus is on securing additional habitat and habitat restoration. In cooperation with the US Fish and Wildlife Service (USFWS), Natural Resources Conservation Service (NRCS), and Wildlife Management Institute (WMI), we are identifying state lands that would be suitable for NEC management and are working with private landowners interested in managing their lands for NEC. Kelly Boland, Maine's NEC Restoration Coordinator, contacts landowners interested in creating and maintaining habitat for NEC, and assists them with habitat restoration efforts. Because we have had high interest from the public, a new position focused on assisting landowners interested in managing their lands for NEC will be put in place summer 2011. This position was funded with outside grant monies and will be based out of the USDA/NRCS office in Scarborough, Maine. The new biologist will help landowners enroll in NRCS conservation programs that provide a payment for habitat management activities for wildlife, such as the Wildlife Habitat Incentive Program, or the Wetlands Reserve Program. These programs provide a win-win situation for landowners and wildlife. Qualifying landowners receive technical and monetary assistance for habitat management and wildlife get additional habitat to live in. The position will be jointly administered by the NRCS, IFW, and WMI. Furthermore, MDIFW and USFWS are working to finalize a Candidate (species) Conservation Agreement with Assurances designed to allow cooperating landowners maximum flexibility in managing activities on their land should the NEC become federally listed as endangered.

The Department's attempt to propagate NEC on Stage Island last year was not successful. Although we had male and female rabbits survive on the island through the winter, we were not able to document any young rabbits in Fall 2010 or Spring 2011. We were not able to identify a specific reason for the high mortality rate on the island or the apparent lack of reproduction. We continue to be interested in propagating NEC, and are working with the Regional NEC propagation group, made up of a number of New England states, to try to work out the problems associated with propagating and translocating NEC.

This work is supported by volunteer assistance, the Maine Department of Transportation, the federal State Wildlife Grants program and Pittman-Robertson Funds program, state revenues from the Outdoor Heritage Fund, Loon Conservation Plate, Chickadee-Checkoff, the sales of hunting and trapping licenses, and other support from the National Fish and Wildlife Federation and Wildlife Management Institute.

--Wally Jakubas

Wolves

There was considerable activity regarding the federal status of wolves this year. Currently, the gray wolf (Canis lupus) is listed as a federally endangered species in Maine and elsewhere in the Northeast, even though they have been extirpated from the Northeast since the early 1900s. Representatives from our Department and other states met this year with the USFWS to discuss revising the federal status of wolves throughout the US. The USFWS is proposing to remove the gray wolf from the endangered species list in the Western Great Lakes, and Northern Rocky Mountains. In addition, they are proposing to revise the range of the gray wolf by removing all or parts of 29 eastern states, including the State of Maine, from the gray wolves' historic range. The USFWS is proposing that the gray wolf never occurred in the east but rather a different species of wolf, the eastern wolf (Canis lycaon), was the species that historically occurred in this region. If the USFWS proposal is accepted, and gray wolves are no longer considered endangered in the east, any eastern wolves emigrating from Canada to Maine or other eastern states would not be protected under the federal Endangered Species Act. In Maine, these animals would be protected under general state laws that make it illegal to hunt or trap animals that do not have a designated hunting or trapping season.

The USFWS is undertaking a status review of the eastern wolf to determine whether it warrants protection under the federal Endangered Species Act. This is where the sledding gets rough. The designation of the eastern wolf as a new species is being challenged by a group of prominent geneticists, who argue that it is just a variant of the gray wolf. To make matters more confusing, the eastern wolf hybridizes with coyotes, and primarily exists in Canada as a wolf/coyote hybrid. The status review will have to consider whether it is possible to distinguish an eastern wolf that has hybridized with a coyote, from a coyote that is carrying some eastern wolf genes. Approximately, 33% of Maine's coyotes carry some wolf genes. Our Department has asked the USFWS to let us participate in this status review, since the outcome could affect future coyote hunting and trapping regulations.

--Wally Jakubas

Mammal Group Funding & Possibilities

Members of the Mammal Group, without exception, are extremely dedicated to the management of Maine's wildlife resources for Maine residents and visitors. However, hard work and dedication by five fulltime biologists can only take a program so far. We have not seen an increase in our operating budget in the 15 years that I have been the Mammal Group Leader, yet we have undertaken a number of new challenges: Canada lynx research, monitoring chronic wasting disease, monitoring white-nose syndrome, windpower project review, overseeing New England cottontail recovery efforts, and providing Departmental support against lynx trapping lawsuits -- to name a few.

To support many of these new efforts we wrote grants to obtain outside funding. Our administrators in Augusta are currently seeking ways to maintain funding for a variety of badly needed moose and deer surveys, but this funding is less than certain. Time spent obtaining funds, managing additional programs, and funding shortfalls have cut into our ability to keep management systems up to date, interact with the public, and conduct fieldwork.

A stable and higher funding base for the Department would allow the Mammal Group to acquire the field data needed to update its management systems for deer, bear, moose, and furbearers. On our most wanted list would be funding for monitoring our moose and deer populations. To do our jobs properly, our group needs additional staff. In particular, another biologist is needed to assist with big game management, and a full-time technical position is needed to better support the species specialists in the group. Added staffing would free up more time for specialists to analyze survey data, write management systems, and conduct field work.

Research questions such as does coyote predation limit deer population growth, is winter-tick and lungworm limiting moose population growth, and how have forestry practices affected marten populations could be addressed with better funding and staffing levels. Better funding and staffing levels would give the Mammal Group more flexibility to address emerging issues such as windpower and its affect on bats, or the recovery of endangered species like the New England cottontail.

For example, bats provide an estimated $4 billion worth of annual ecological services in the form of agricultural pest control in North America. There is another estimate that wind turbines kill as many as ½ million bats annually in North America. We already know that some bat species are in real trouble in the eastern U.S. from White-nose Syndrome – what added effect will mortalities at wind farms have? What about birds – also known to be killed by wind turbines? Nobody has thoroughly examined the situation in Maine yet, while wind-farm development has been rapid in recent years, but we are trying to promote and see research funded to discover the truth of the matter.

--Wally Jakubas (and Shawn Haskell)

Reptile, Amphibian, and Invertebrate Group

Maine is home to 18 species of frogs and salamanders (amphibians), 16 species of turtles and snakes (reptiles), and over 16,000 species of terrestrial and freshwater invertebrates, from beetles and butterflies to mayflies and mussels, to name just a few. Coordinating survey, research and conservation priorities for such a diverse suite of organisms is challenging! One of the Group's highest priorities is to address the protection and recovery needs of the large number of reptiles and invertebrates currently on the state's official list of Endangered and Threatened species (21 of the 46 species). Some state endangered invertebrates, such as the Katahdin Arctic Butterfly and Roaring Brook Mayfly, are state or regional endemics – found nowhere else in the world but in Maine or a small area of the Northeast. The Reptile, Amphibian, and Invertebrates (RAI) Group works to ensure that these and other less familiar but ecologically important species remain a part of Maine's rich natural heritage.

A recent poll confirms that a majority of Maine citizens believe the Department is funded largely from State general revenues. This is not the case. In fact, less than 6% of Department revenue is provided by State general funds. This is unsustainable given MDIFW's mandate to serve a much broader constituency than license-paying Maine sportsmen, including all of those citizens who benefit from non-consumptive wildlife services provided by the Department. These include the Department's efforts at: a) nongame species survey, research and protection, b) endangered and threatened species recovery, c) wildlife viewing opportunities on >100,000 acres of protected State Wildlife Management Areas , and d) environmental review analyses informing well-planned development in proximity to sensitive wildlife habitats. The RAI Group is one of the Department's few units devoted entirely to nongame and wildlife-diversity services for the general public. As such, the RAI Group is wholly dependent on nontraditional sources of revenue, mainly the Loon Conservation License Plate and Chickadee Check-off funds. Unfortunately, both of these funding sources are in steep decline over the past decade, and a more dependable revenue stream is critical if the Department is to meet its legislative mandate "to conserve, by according such protection as is necessary…, all species of fish or wildlife found in the State, as well as the ecosystems upon which they depend".

Phillip deMaynadier, Wildlife Biologist & Group Leader – Phillip supervises Group activities and serves as the Department's lead biologist on issues related to amphibians, vernal pools, butterflies, damselflies, and dragonflies. He also represents the Department on several forestry and wetland nongame wildlife state and regional working groups.

Beth Swartz, Wildlife Biologist – Beth serves as the Department's lead biologist on aquatic invertebrate issues, with recent efforts devoted to the survey and conservation of Clayton's Copper butterfly, freshwater mussels, and rare mayflies. Beth also helps coordinate the Department's vernal pool data review responsibilities.

Jonathan Mays, Wildlife Biologist – Jonathan serves as the Department's lead biologist on reptile issues where he coordinates survey and research on several rare turtle and snake species. Jonathan is also coordinating efforts to document the distribution and status of all reptiles, amphibians, spiders, snails, and tiger beetles.

Reptile, Amphibian, and Invertebrate Conservation and Management

Amphibians and Reptiles

Partners in Amphibian and Reptile Conservation (PARC)

MDIFW continues to cooperate with an initiative entitled Partners in Amphibian and Reptile Conservation (PARC). Modeled partly after the successful Partners in Flight (PIF) bird conservation program, PARC's mission is to forge partnerships among diverse public and private organizations in an effort to stem recent declines of amphibian and reptile (herptofauna) populations worldwide. MDIFW regularly participates in northeastern chapter PARC meetings where discussions focus on conservation initiatives for amphibians, reptiles, and habitats of regional species of conservation concern. MDIFW helped host and coordinate the PARC-Northeast annual meeting in Winter Harbor in August of 2010.

To date, PARC-Northeast has made progress on a) drafting model state herpetofauna regulations, b) compiling a list of regional species of conservation concern, c) publishing management recommendations for important habitats of herptofauna, and d) designing science-based guidelines for nominating high value focus areas entitled Priority Amphibian and Reptile Conservation Areas (PARCAs) . For more information on national PARC conservation efforts, or to join the northeastern chapter, visit the PARC website at www.parcplace.org.

Maine Amphibian and Reptile Atlas Project (MARAP)

From 1986–1990, MDIFW, in cooperation with Maine Audubon and the University of Maine, conducted the Maine Amphibian and Reptile Atlasing Project (MARAP). During a four-year period, over 250 volunteers from around the state

contributed approximately 1,200 records of observations of amphibians and reptiles. This initiative culminated in the 1992 publication of the book The Amphibians and Reptiles of Maine. The first edition sold out within two years of publication.

By 1998, considerable new data had been compiled, and there was increasing demand for updated information on the state's amphibians and reptiles. Editors Malcolm Hunter, Jr., Aram Calhoun, and Mark McCollough revised a second edition, incorporating information from 1,300 new records into updated range maps and species narratives, and added color photographs, and a CD of the calls of the frogs and toads of Maine. Copies of the updated 1999 edition of Maine Amphibians and Reptiles can be ordered for $19.95 from the Information Center, MDIFW (207-287-8000), or from the online store found on the Department's website: http://www.maine.gov/ifw.

MDIFW continues this atlasing work and maintains a comprehensive database on the distribution of Maine's 34 amphibian and reptile species. Though most of this work is opportunistic, as of Spring 2011 over 6,300 entries from 634 volunteers have been logged. There is much still to learn regarding the distribution and ecology of Maine's herpetofauna, and we encourage members of the public to share their photo-documented observations by submitting a MARAP reporting form, available on the MDIFW's website in the Species Information section. Please submit observations of any of the four state-listed reptiles: Eastern Box Turtle (Endangered), Blanding's Turtle (Endangered), Spotted Turtle (Threatened), and Black Racer (Endangered) -- to MDIFW immediately (jonathan.mays@maine.gov or call 207-941-4475).

Maine Amphibian and Reptile Atlas Project (MARAP) Site Card

Date: | Township: | County: | Site Name: | DeLorme Map Page & Grid (e.g., 02B3):

Name: | Address: | City: | State: | Zip Code: | Phone: | Email: | Additional Observers:

Location & Directions: (be specific, reference mapped landmarks)

GPS Coordinates: UTM-E or Latitude | UTM-N or Longitude | Datum (NAD 83 or 27)

Habitat Description: (type, associated vegetation, microhabitat)

Species Name (and # observed)	Distinguishing Characteristics (that led to species identification)	Yes or No: Photo*	Handled	Observed	Heard (frogs only)	ID Confidence (%)
1						
Additional Notes (Behavior, Sex, Age, Etc.)						
2						
Additional Notes (Behavior, Sex, Age, Etc.)						
3						
Additional Notes (Behavior, Sex, Age, Etc.)						
4						
Additional Notes (Behavior, Sex, Age, Etc.)						
5						
Additional Notes (Behavior, Sex, Age, Etc.)						
6						
Additional Notes (Behavior, Sex, Age, Etc.)						

* When possible PLEASE provide documentation photos.

Return this form and labeled photos to:
MARAP: Reptile, Amphibian, and Invertebrate Group
Department of Inland Fisheries and Wildlife
650 State Street, Bangor, ME 04401

OR email

Print Form

jonathan.mays@maine.gov
or
phillip.demaynadier@maine.gov

Figure 2. Maine Amphibian and Reptile Atlas Project (MARAP) Record Card.

This work is supported by volunteer assistance, the federal State Wildlife Grants program, and state revenues from the Loon Conservation Plate and Chickadee Check-off funds.

-- Jonathan Mays and Phillip deMaynadier

Amphibian Monitoring

Since 1989, scientists have been concerned that frogs, toads, and salamanders (amphibians) may be declining worldwide. Unfortunately, a recent scientific analysis confirms these suspicions with fully 32% of the world's amphibian species now considered threatened with extinction, a rate exceeding that for birds or mammals. Maine, like many other states, had little data to assess trends in its amphibian populations. In 1996, MDIFW and Maine Audubon received an Outdoor Heritage Fund grant to initiate a statewide amphibian-monitoring program, launched in 1997. Maine's Calling Amphibian Survey is part of a nationwide effort organized by the U.S. Geological Survey. Sixty-one road-monitoring routes were randomly established across the state. Each spring and summer season, volunteers drive their individually assigned route three times, recording the diversity and intensity of calling frogs and toads. Some vacant routes still exist, with new volunteers especially needed in northern Maine. Participants are provided training materials to assist them with the identification of each of Maine's nine species of frogs and toads. With 14 years of data collected (through 2010), we anticipate the ability to analyze preliminary population trends for several species of frogs and toads soon. Currently Leopard Frogs (Special Concern), and Mink Frogs are among the state's least commonly reported species. Those interested in participating in this citizen-science initiative should contact Maine Audubon's Susan Gallo at 207-781-6180 (ext. 216) or visit the website at: www.maineaudubon.org/conserve/citsci/mamp.shtml.

This work is supported by volunteer assistance, the federal State Wildlife Grants program, and state revenues from the Loon Conservation Plate and Chickadee Check-off funds, and from Maine Audubon Society.

--Phillip deMaynadier

Rare Snakes
Maine is currently home to at least nine species of snake, one of which is state Endangered (Northern Black Racer) and two of which are state Special Concern (Ribbon Snake and Brown Snake). The Timber Rattlesnake, was historically native but is now thought to be extirpated from the state. The Maine Amphibian and Reptile Atlasing Project (MARAP) continues to provide location records for all snakes, but more detailed research is needed in order to assess movements, habitat requirements, and potential threats to our rare snakes.

To determine home range size, over-wintering sites, and habitat use, MDIFW conducted a radio telemetry project on Black Racers in southern Maine. Racers are long, slender snakes, jet black in color with a white chin/throat and gray belly. Black Racers reach the northern extent of their range in southern Maine. At present, less than 30 sites in Maine are known to host Black Racers and only six of those locations have had racers observed at them within the last five years. Fourteen racers were implanted with radio transmitters and data analysis has shown that these animals are using very large home ranges in early successional habitat (ca. 250 contiguous acres of predominantly scrub/shrub habitat and surrounding grasslands and open forests). Knowledge gained from this study is informing protection efforts and habitat management of Maine's longest and fastest reptile.

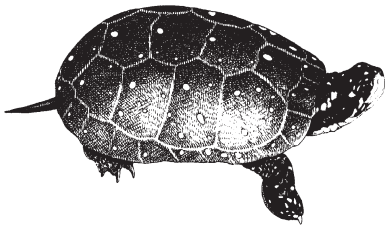
Historically, snakes have been misunderstood, feared, and even persecuted. Many have stated that snakes are among the least appreciated of Maine's wildlife. While this may be true, snakes fill an important place in the environment and provide balance: preying on small mammals, insects, and other reptiles and amphibians, and providing food for various predatory birds and mammals. Snakes are fascinating creatures and our state is certainly richer with them here.

Funding for this work comes from the federal State Wildlife Grants program, Maine Department of Transportation, Loon Conservation Plate, and Chickadee Check-off Funds.

--Jonathan Mays

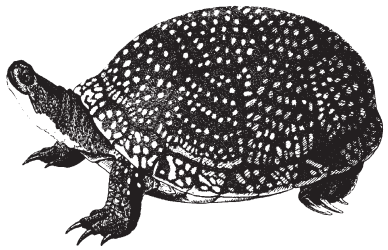
Rare Turtles
For nearly 20 years, MDIFW has actively researched the distribution and status of Blanding's and Spotted Turtles in Maine. Blanding's Turtles (Endangered) are 7 to 10 inches long with a yellow throat and light colored flecking on a helmet shaped shell. Spotted Turtles (Threatened) are 5 to 6 inches in length, have yellow spots on the head, tail, and legs and a somewhat flat, yellow spotted shell. Both species are semi-aquatic preferring small, shallow wetlands in southern Maine including pocket swamps and vernal pools. Undeveloped fields and upland forests surrounding these wetlands provide habitat for nesting, estivating (a period of summer inactivity), and movements between wetlands.

Despite the attention these turtles have received, habitat loss and fragmentation continue to threaten both species' persistence in Maine. As the human population expands, road mortality becomes an ever increasing threat. The turtle's shell has provided sufficient protection from predators for millions of years, but unfortunately is no match for a car tire. Both Blanding's and Spotted Turtles are long-lived animals that take a minimum of seven (Spotted) to 14 (Blanding's) years to reach reproductive age. This coupled with low hatching success places all the more importance on adult survivorship. Recent population analyses of several freshwater turtle species indicate that as little as 2-3% additive annual mortality of adults is unsustainable, leading ultimately to local population extinction. In other words, losing just a few breeding adult turtles each year to road kill may be the greatest factor threatening the persistence of Blanding's and Spotted Turtles in Maine.



MDIFW is currently involved in three active conservation projects benefitting Blanding's and Spotted Turtles in Maine:

- Cautionary Road Signage Project (Turtle X-ing): A cooperative study by the University of Maine and MDIFW identified high-density rare turtle areas with road-crossing hotspots. With the assistance of the Maine DOT, The Nature Conservancy, and local towns, temporary yellow warning signs were installed in strategic locations to alert motorists to the possible presence of turtles on the roadway. The signs are deployed seasonally, coinciding with the period when overland turtle movements are greatest, thus helping to maximize the signs impact by reducing "sign fatigue" by local commuters. This project is now in it's 6th year.
- Conservation of Blanding's Turtle in the Northeast: MDIFW along with four other Northeastern states were just awarded a Competitive State Wildlife Grant to develop a regional model and plan for Blanding's Turtles. This work, including a genetic assessment facilitated through Dr. Rhymer at the University of Maine, will begin spring 2012.



- Wildlife Road Watch: Partnering with Maine Audubon and Maine DOT, a volunteer initiative to report wildlife-road interactions (both alive and dead) was launched in 2010. Data generated from this project may help in planning future projects and identifying mitigation efforts (e.g., additional signage areas, critter crossings, exclusionary fencing). In addition to incidental sightings, participants may also choose to adopt a road segment for repeated monitoring. For more information on the Wildlife Road Watch, please visit: http://www.wildlifecrossing.net/maine/

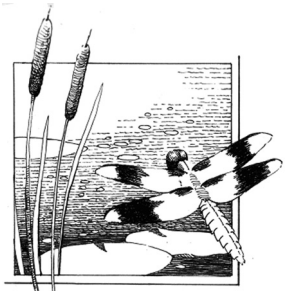
This work is supported by volunteer assistance, the federal State Wildlife Grants program, and state revenues from the Loon Conservation Plate, Chickadee Check-off funds, and the Maine Outdoor Heritage Fund, and from the Maine Department of Transportation, and The Nature Conservancy.

-- Jonathan Mays

Invertebrates

Rare Dragonflies

Insects in the order Odonata, damselflies and dragonflies, are a conspicuous component of Maine's wildlife diversity. Presently, 158 species have been documented in the state, comprising nearly 36% of all North American odonate species. Several of Maine's odonate species are of national and global conservation concern. Maine currently lists three species as Endangered or Threatened and 25 species as Special Concern. While several odonates are highly sensitive to freshwater habitat degradation, baseline information for the group had been lacking in Maine, until recently.



In 1998, MDIFW initiated the Maine Damselfly and Dragonfly Survey (MDDS), a multi-year, citizen scientist atlasing initiative designed to improve our knowledge of the distribution, status, and habitat relationships of damselflies and dragonflies statewide. In addition to accumulating a tremendous amount of data, the MDDS engaged over 200 of Maine's non-game enthusiasts and raised public awareness of invertebrate conservation generally. Having completed its final "official" field season in 2003, the survey's results exceeded expectations and are best summarized by the following:

Public Outreach and Involvement:

Volunteer participation statewide:	>200
Volunteers trained in MDDS seminars:	95
Major press articles covering the MDDS project:	5
Website hits (http://mdds.umf.maine.edu/~odonata/)	>20,000

Scientific Contributions:

Total records submitted (% increase over 1999 baseline):	17,264 (229%)
New state species records:	10
New U.S. species records (Quebec Emerald & Canada Whiteface):	2
Scientific publications completed or in progress:	5

With the volunteer atlasing component of the MDDS project coming to closure, MDIFW recently contracted Paul M. Brunelle, an odonate expert and graphic design artist from Nova Scotia, to assist with authoring and designing the project's capstone product: *An Atlas and Conservation Assessment of Acadia's Damselfly and Dragonfly Fauna*. Populated largely with data contributed by MDDS volunteers, this atlas will serve as the first authoritative publication on the distribution and natural history of odonates from Maine and the Canadian Maritime Provinces.

This work is supported by volunteer assistance, the federal State Wildlife Grants program, and state revenues from the Loon Conservation Plate, Chickadee Check-off funds, and the Maine Outdoor Heritage Fund, and the U.S. Environmental Protection Agency.

--Phillip deMaynadier

Maine Butterfly Survey

Hessel's Hairstreak, Purple Lesser Fritillary, and Crowberry Blue are just some of the state's rarest butterflies that are both colorful in name and on the wing. In an effort to improve our knowledge of these and other rare butterflies MDIFW is actively studying the group during statewide regional surveys. Attractive, conspicuous, and ecologically important, butterflies have garnered increasing attention from scientists and the general public. By documenting the distribution and status of the state's butterfly fauna MDIFW hopes to improve its understanding of the group and prioritize conservation efforts towards those species most vulnerable to state extinction.

In support of this goal, MDIFW received a grant from the Outdoor Heritage Fund in 2002 to contract a professional lepidopterist, Dr. Reginald Webster from New Brunswick, to help assemble a comprehensive assessment of the state's butterfly fauna. Drawing from published literature and specimen records located in museums and amateur collections throughout the Northeast, Reggie helped MDIFW assemble the first baseline atlas and database of Maine's butterfly fauna – an essential step toward conservation of the group. The baseline atlas project compiled nearly 9,000 records and added 11 previously undocumented butterflies to the state list, which now stands at 120 species. Of special note is the relatively high proportion (~20%) of Maine butterflies and skippers that are extirpated (5 species) or state-listed as Endangered, Threatened, or Special Concern (19 species), a pattern consistent with global trends elsewhere for the group. Contact MDIFW to receive an updated checklist of the butterflies of Maine (phillip.demaynadier@maine.gov) or visit http://www.maine.gov/ifw/wildlife/surveys_reports/index.htm to download a copy of Maine's first baseline butterfly atlas.

Finally, we are pleased to announce that a statewide volunteer butterfly atlas took flight in 2007. Sponsored by MDIFW, in partnership with the University of Maine at Farmington (Dr. Ron Butler), Colby College (Dr. Herb Wilson), and Dr. Reginald Webster of New Brunswick, the Maine Butterfly Survey (MBS) is a 6-year, statewide, volunteer survey effort. Following in the tradition of previously successful state-sponsored wildlife atlasing projects, including the Maine Damselfly and Dragonfly Survey, data generated from the MBS comes primarily from citizen scientists. The survey will help fill information gaps identified during the baseline assessment (above) on butterfly distribution, flight seasons, and habitat relationships for one of the state's most popular insect groups. To become involved in this project or to learn more about Maine's butterflies contact the volunteer coordinator, Dr. Herb Wilson, at whwilson@colby.edu, or check the MBS website at: http://mbs.umf.maine.edu.

This work is supported by volunteer assistance, the federal State Wildlife Grants program, and state revenues from the Loon Conservation Plate, Chickadee Check-off funds, and the Maine Outdoor Heritage Fund, and The Nature Conservancy.

--Phillip deMaynadier

Clayton's Copper Butterfly

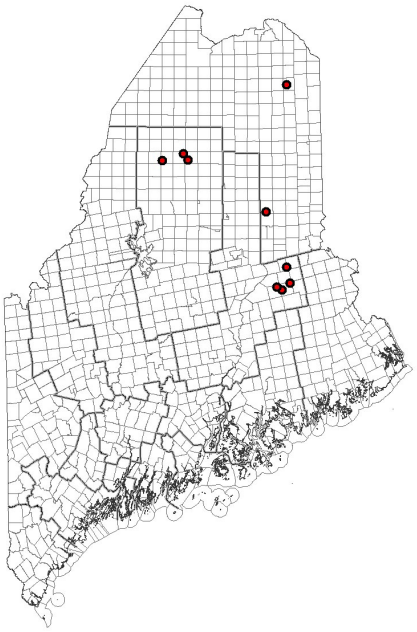


Figure 3. Distribution of Clayton's Copper in Maine.

The Clayton's Copper is a small, orange-brown butterfly known only from a handful of sites in Maine and New Brunswick. It is found only in association with its single larval host plant, the shrubby cinquefoil, which also serves as the primary nectar source for adults. This uncommon shrub rarely occurs in stands large enough to support viable populations of the butterfly. Where it grows best is in circumneutral fens (peatlands rich in calcium carbonate or limestone) – a rare habitat type in Maine. Not found everywhere its host plant grows, the Clayton's Copper is even rarer. Currently, this endangered butterfly is known from just 9 sites in northern and eastern regions of the State.

Clayton's Copper takes one year to complete its life cycle. In late July and August, when shrubby cinquefoil is blooming, females lay their eggs singly on the underside of cinquefoil leaves. Leaves and eggs drop to the ground in autumn, and the eggs overwinter. The pale green larvae hatch in spring and crawl back up the plant to feed on its leaves. After the larvae molt and pupate in early summer, adult butterflies emerge during July and August to start the cycle over again. Each butterfly lives only a few weeks at most and by late August to mid September the colorful winged adults are gone for another year.

In 2010, MDIFW continued its partnership with the University of Maine to investigate key life history, habitat and conservation questions about this rare butterfly. We now have estimates for population size, flight period, and cinquefoil patch size at each colony, as well as a better understanding of the conservation importance of each site. The University is also looking at the genetic relationship between the distinct population clusters of Clayton's Copper. This research will help shed light on if and how the butterflies move between sites and whether each subpopulation has the ability to persist over time. Another study is focused on identifying environmental characteristics of the wetlands where Clayton's Copper is found and on specific qualities of the host plant, which might explain why the butterfly occurs at some cinquefoil stands but not others.

Funding for this work comes from the federal State Wildlife Grants program, University of Maine, The Nature Conservancy, American Philosophical Society, and state revenues from the Maine Outdoor Heritage Fund, Loon Conservation Plate, and Chickadee Check-off funds.

--Beth Swartz

Rare Tiger Beetles

Tiger beetles are handsome, active insects that make their living running down smaller insect prey on the ground. These terrestrial beetles move so fast that they outrun their eye sight and often have to pause to refocus – a behavior that aids in quick identification of adults in the field. Though many are dark colored and camouflage nicely with their preferred sandy or mud habitat, some species can be quite striking in appearance with iridescent colors or intricate body patterns. Maine is home to 14 species of tiger beetles, three of which are considered state "Special Concern" due to their limited range and specialized habitat requirements. Tiger beetles have been considered good 'indicator species' of biodiversity.

As part of on-going Eco-regional surveys in the Central and Western Mountains, MDIFW conducted surveys for the Cobblestone Tiger Beetle (Species of Special Concern) in 2010. The Cobblestone Tiger Beetle was only recently discovered in Maine during 2009 surveys. This species with its distinctive markings and orange abdomen is considered globally imperiled (G2) and ranked critically endangered (by NatureServe) in New Hampshire, New Jersey, New York, Pennsylvania, and Vermont. In Canada, this beetle is known from only a few sites in New Brunswick where it is listed Endangered by the Committee on the Status of Endangered Wildlife in Canada. The newly discovered Maine population fills a critical distribution gap and offers additional hope for this species' recovery. As the name implies, the Cobblestone Tiger Beetle prefers cobble bars on vegetated islands in medium to large rivers. It appears these rivers need to be un-dammed to allow natural, seasonal scouring of the cobble beaches but not prolonged flooding. Due to an apparently limited range (at present a 10 km stretch of a single river) and seemingly specialized habitat, the Cobblestone Tiger Beetle was recently listed state Special Concern but is a strong candidate for future state Endangered/Threatened status. Additional surveys during 2010 were unsuccessful in finding other populations of the beetle but did expand its range on the previously known river by 2 km.

MDIFW also surveyed coastal salt-marsh areas for another state Special Concern species in 2010, the Salt Marsh Tiger Beetle. This species appears to be declining in the Northeast: 'Possibly Extirpated' in New Hampshire; 'Critically Imperiled' in Rhode Island, Connecticut, and Delaware; 'Vulnerable' in New York. Salt Marsh Tiger Beetle habitat is limited in Maine and potentially threatened by tidal erosion, rising sea levels (per climate change models), human development, and coastal oil spills. Previously known from only four locations in Maine, the 2010 surveys added six new river/coastal marsh systems for the Salt Marsh Tiger Beetle; however the species status remains precarious in Maine as the 10 known sites represent most if not all the available habitat for this specialized salt-marsh dweller.

Funding for this work comes from the federal State Wildlife Grants program, and state revenues from the Outdoor Heritage Fund, Loon Conservation Plate, Chickadee Check-off funds, and MDEP Oil Spill funds.

--Jonathan Mays

Roaring Brook Mayfly

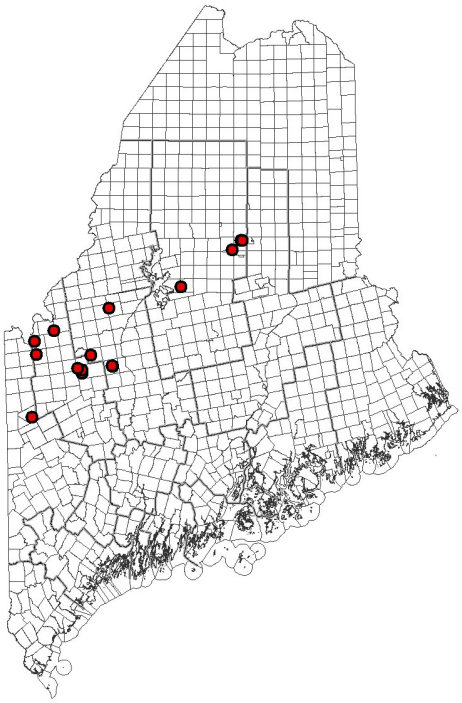


Figure 4. Distribution of Roaring Brook Mayfly in Maine.

While many of Maine's mayfly species are widely distributed and relatively common, one holds the distinction of being among the rarest in the world. Unofficially dubbed the "Roaring Brook Mayfly", *Epeorus frisoni* was for many years known only from a single adult collected on Mt. Katahdin in 1939. This long history of a lone occurrence, despite extensive surveys of mayflies throughout Maine and North America, ultimately led to the species being listed as Endangered in Maine in 1997.

In 2003, MDIFW conducted the first surveys in over 60 years to specifically look for this rare insect. With special permission from Baxter State Park, we sampled mayfly larvae in three Katahdin streams in an attempt to reconfirm the species' presence and gather information that might help direct surveys elsewhere. As a result, we were able to verify that some of the larvae found in two of the streams matched the specimen collected in 1939. Armed with basic information about the mayfly's life cycle and habitat preferences, we then began looking for the Roaring Brook Mayfly in similar habitats around the State.

As of 2010, MDIFW has documented 12 more streams where the mayfly occurs, all clustered in the mountains of central and western Maine, bringing the total number of sites currently known in Maine to 14. We also recently learned of a specimen collected in the Green Mountains of Vermont and another in the White Mountains of New Hampshire. While we now know the Roaring Brook Mayfly is not confined just to Mt. Katahdin, or even to Maine, it does appear to be New England's only endemic mayfly - restricted to cold, undisturbed, high-elevation streams of the northern Appalachian Mountain Range.

There's still much we don't know about the Roaring Brook Mayfly, but MDIFW has been able to use data collected during our surveys over the past several years to better inform conservation measures at sites where the mayfly is known or likely to occur. Even though high elevation stream habitats are typically isolated from most traditional land use impacts, potential conflicts with activities such as industrial windpower and resort development are increasingly being reviewed by MDIFW. To help ensure the State meets its obligation to protect this endangered species, the Department has developed recommendations for avoiding and minimizing negative effects of intensive development and commercial forestry activities on the mayfly's habitat. These include guidelines for placement and construction of stream crossings, and the maintenance of adequate forest canopy cover and riparian buffers.

MDIFW will continue surveying for new occurrences of the Roaring Brook Mayfly and apply all that we learn to conserve this globally rare species as part of Maine's diverse and unique natural heritage.

Funding for this work comes from the federal State Wildlife Grants program, and state revenues from the Maine Outdoor Heritage Fund, Loon Conservation Plate, and Chickadee Check-off funds.

--Beth Swartz

Freshwater Mussels

Freshwater mussels are relatively sedentary, bottom-dwelling invertebrates found in most of Maine's lakes, ponds, rivers, and streams. Often referred to as a "clam," the freshwater mussel's inconspicuous and seemingly drab lifestyle belies its importance. As filter-feeders, mussels provide a vital service to aquatic environments by filtering suspended particles such as algae, bacteria and detritus from the water. The by-products are then returned to the ecosystem as essential nutrients for other organisms to use. Mussels are also a favorite menu item for a variety of wildlife such as muskrats, raccoons, otters, and some fish.

The life cycle of freshwater mussels might surprise you. Starting life in specialized brood chambers of the female's gills, they are released into the water column as tiny free-floating larvae called "glochidia", which are quite different in appearance from the adults. The glochidia have only a short period of time to encounter and attach to just the right fish species in order to successfully mature into the more familiar adult form. Some female mussels actually develop a "lure" that mimics a small minnow, crayfish, or aquatic insect in order to attract a potential host for her larvae. When a predatory fish takes the bait, it gets a mouth full of glochidia, which then encyst in the fish's gills or fins. Doing no harm to the fish, the tiny mussels eventually drop off their mobile nurseries and burrow into the substrate. They often remain in the same spot for their entire lives – a period that can span 100 years or more in some species.

Because they constantly filter large volumes of water, can not leave their surroundings, and live a long time, freshwater mussels are sensitive to contaminants and changes in their environment. Consequently, they are one of our most valuable indicators of water quality and aquatic ecosystem health. They are also one of the most imperiled groups of animals in the country. Of the nearly 300 species of freshwater mussels found in the United States, more than a third have already vanished or are in danger of extinction, and over 75% are listed as Endangered, Threatened, or Special Concern at the state level. These dramatic declines have been caused largely by the degradation and loss of mussel habitat from pollution, dams, and the channelization and sedimentation of once clean, free-flowing rivers and streams. In some parts of the country, the accidental introduction of a prolific foreign competitor, the zebra mussel, is also jeopardizing many populations.

Maine's freshwater mussel fauna has fared relatively better than that of many states. We haven't lost any species, our freshwater habitats are reasonably clean, and the zebra mussel has not yet found its way into our waterways. However, we are not immune to the problems of habitat loss and degradation that have eliminated populations and extirpated species in other parts of the country. Of our 10 native species, three (Yellow Lampmussel, Tidewater Mucket, Brook Floater) are currently listed as Threatened under the Maine Endangered Species Act and one (Creeper) is considered of Special Concern. Fortunately, compared to most states within the range of these species, Maine hosts some of the best remaining populations and may be a last stronghold for these rare mussels.

Eastern Pearlshell (*Margaritifera margaritifera*)	
Eastern Elliptio (*Elliptio complanata*)	
Triangle Floater (*Alasmidonta undulata*)	
Brook Floater (*Alasmidonta varicosa*)	**THREATENED**
Eastern Floater (*Pyganodon cataracta*)	
Alewife Floater (*Anodonta implicata*)	
Creeper (*Strophitus undulatus*)	**SPECIAL CONCERN**
Yellow Lampmussel (*Lampsilis cariosa*)	**THREATENED**
Eastern Lampmussel (*Lampsilis radiata radiata*)	
Tidewater Mucket (*Leptodea ochracea*)	**THREATENED**

Table 12. Freshwater Mussels of Maine

While we have a pretty good idea of where our rare species occur, we don't know very much about their distribution and abundance at individual sites or which populations might be vulnerable to further decline. In 2010, MDIFW continued investigating the status of Maine's southernmost occurrences of the Brook Floater in the Pleasant (Cumberland Co.) and Sheepscot Rivers. Brook Floater populations in these rivers are isolated from the species' core range in the Penobscot River and Downeast watersheds, and are also more at-risk from habitat degradation by surrounding land use. So far, the study has revealed a significant decline in numbers and habitat quality in the Pleasant River, where extensive bank erosion and sedimentation have severely degraded habitat and likely resulted in mussel mortality. This population is so small and in such poor shape that we fear it may be extirpated in the near future. The Sheepscot River population also appears small and comprised mainly of old individuals, but additional survey work is needed to complete the evaluation.

MDIFW also continues to work closely with the Penobscot River Restoration Project, which will be removing two hydropower dams on a 5½ mile stretch of the Penobscot where all four listed mussel species occur. Together we are developing a recovery and relocation plan that will minimize mortality to rare mussels when acres of river bottom are permanently dewatered. Part of that plan will include a post-monitoring effort to document the mussels' survival and how they respond to the change in their environment from an impounded to free-flowing system. While habitat should improve for Brook Floaters and Creepers, the outcome for Yellow Lampmussels and Tidewater Muckets is less certain. With proposals to remove hydropower impoundments increasing in Maine, the Penobscot River Restoration Project is an important opportunity to learn more about how dam removal and river restoration affects the status and longterm conservation of these rare mussels.

More information on Maine's mussels can be found in *The Freshwater Mussels of Maine* (Nedeau et al. 2000), available through the Department's online store (http://www.mefishwildlife.com/) or Information Center (207-287-8000).

Funding for this work comes from the federal State Wildlife Grants program, and state revenues from the Loon Conservation Plate, and Chickadee Check-off funds.

--Beth Swartz

Special Habitats for Reptiles, Amphibians, and Invertebrates

Pitch Pine Woodlands and Barrens

Pitch Pine woodlands and barrens are lightly forested upland areas with dry, acidic, often sandy soils. Pitch pine, red pine, scrub oak, blueberry, huckleberry, and/or bluestem grasses are commonly among the sparse vegetation of this unique natural community. It's thought that over half of the state's original pine barren acreage has been lost to residential development, agriculture, and gravel mining. Many dry woodlands and barrens also require periodic fire to prevent succession to a more common, closed canopy white pine-oak system, which is a natural disturbance that is now short-circuited by habitat fragmentation and fire suppression.

Once viewed as unproductive "wastelands", Maine's few remaining pine woodlands and barrens are now recognized as areas of exceptional wildlife value, providing habitat for a variety of highly specialized plants and animals. Several rare and endangered species persist in the State's few remaining intact barren communities, mainly in the towns of Kennebunk, Wells, Waterboro, Shapleigh, Hollis, and Fryeburg. These unique habitats are especially rich in rare lepidoptera (butterflies and moths), hosting species that feed on the specialized barrens vegetation, such as Edwards' Hairstreak (Endangered), Sleepy Duskywing (Threatened), Cobweb Skipper (Special Concern), and Barrens Buck Moth (Special Concern). Other rare species associated with Maine's barrens include Black Racers (Endangered), Grasshopper Sparrows (Endangered), Upland Sandpipers (Threatened), Short-eared Owls (Threatened), and Northern Blazing Star (a Threatened plant). To learn more about two barrens of statewide ecological significance visit "Focus Area Descriptions" on the Maine Natural Areas Program website (http://www.maine.gov/doc/nrimc/mnap/focusarea/index.htm), and select "Kennebunk Plains and Wells Barrens" or "Waterboro and Shapleigh Barrens" in York County.

Funding for this work comes from the federal State Wildlife Grants program, state revenues from the Loon Conservation Plate and the Chickadee Check-off, and The Nature Conservancy.

--Phillip deMaynadier

Vernal Pools

Vernal pools are small, forested wetlands that frequently fill with water from early spring snowmelt and rains and then dry partly or completely by mid to late summer. Many of Maine's amphibians use vernal pools as breeding or foraging habitat. Some, like Spotted Salamanders, Blue-spotted Salamanders, and Wood Frogs, breed more successfully in these fishless habitats than in any other wetland type. Additionally, vernal pools provide habitat for a variety of small mammals, wading birds, waterfowl, aquatic invertebrates, and several state-listed animal species including Blanding's Turtles (Endangered), Spotted Turtles (Threatened), Wood Turtles (Special Concern), Ribbon Snakes (Special Concern) and Ringed Boghaunter dragonflies (Threatened).

We still have more to learn about why some vernal pools receive greater wildlife use than others. To this end, grants from the Maine Outdoor Heritage Fund and the U.S. Environmental Protection Agency helped support a University of Maine study by Dr. Robert Baldwin and Dr. Aram Calhoun to research the wildlife use and characteristics of vernal pools in York County. Rob and Aram's results suggest that Wood Frogs and other pool-breeding amphibians range widely in the forested landscape following breeding and that surrounding upland forests and swamps provide important habitat outside of the brief pool-breeding season. Rob also developed a landscape model that highlights the vulnerability of vernal pools in southern Maine to habitat loss and fragmentation with insufficient conservation lands and wetland regulations.

MDIFW is currently cooperating with the Department's of Environmental Protection (MDEP) and Conservation (MDOC), Maine Audubon Society, and the University of Maine to identify potential strategies for protecting the unique values provided by smaller wetlands that "fall through the cracks" of current wetland regulations. Workshops on vernal pools continue to be held throughout the state for landowners and land managers, and several new publications designed to offer voluntary techniques for protecting vernal pools and their wildlife are now available. A vernal pool fact sheet, describing threats and management considerations, is available upon request from MDIFW for use by landowners, municipalities, land trusts, and other cooperators. The Maine Citizen's Guide to Locating and Documenting Vernal Pools provides a comprehensive introduction to recognizing and monitoring vernal pools, including color photographs of the indicator species. Also available to the public are two complementary guide-books for protecting vernal pool habitat during timber management (Forestry Habitat Management Guidelines for Vernal Pool Wildlife) and development (Conserving Pool-breeding Amphibians in Residential and Commercial Developments in the Northeastern United States). Together, these publications provide recommendations designed to help maintain functioning vernal pool landscapes throughout Maine. All of the guides can be obtained by contacting Becca Wilson at Maine Audubon Society (207-781-6180 ext. 222; bwilson@maineaudubon.org).

Finally, the MDIFW and MDEP developed a definition of Significant Vernal Pools, a relatively new Significant Wildlife Habitat under the state's Natural Resource Protection Act that was approved by the 120th Maine Legislature in 2006. Criteria for designating Significant pools include a) the presence of a state Endangered or Threatened species, or b) evidence of exceptional breeding abundance by specialized amphibian indicator species. Recognizing a subset of the State's vernal pools as Significant (about 20–25% of all vernal pools) will help biologists provide guidance on development activities within a critical upland life zone surrounding one of the state's highest-value wildlife habitats.

Funding for MDIFW's efforts at research and protection of vernal pools comes from the federal State Wildlife Grants program, state revenues from the Outdoor Heritage Fund, Loon Conservation Plate, and the Chickadee Check-off, and the U.S. Environmental Protection Agency.

--Phillip deMaynadier

Maine Department of Inland Fisheries and Wildlife

CHANDLER E. WOODCOCK, COMMISSIONER
ANDREA L. ERSKINE, DEPUTY COMMISSIONER

Members of the Commissioner's Advisory Council

Cathy A. DeMerchant (Vice-Chair), Androscoggin, Kennebec, Sagadahoc Counties; telephone: 923-3287
Wade Kelly, Aroostook County; telephone: 398-4478
Richard Thurston, Cumberland County; telephone: 885-5441
Stephen Philbrick (Chair), Franklin, Oxford Counties; telephone: 864-3671
Jeffrey C. Lewis, Hancock County; telephone: 667-6859
Michael Witte, Knox, Lincoln, Waldo Counties; telephone: 677-2587
Alan Greenleaf, Penobscot County; telephone: 827-4888
Lila S. Ware, Piscataquis, Somerset Counties; telephone: 474-5430
Lance S. Wheaton, Washington County; telephone: 448-7726
Ron Usher, York County; telephone: 929-3474

Main Office: #41 State House Station, Augusta, Maine 04333-0041
For Administration, Fisheries and Wildlife, Warden Service, general information about fish and wildlife, licenses, and boating and recreational vehicle registration... call (207) 287-8000.

Check out our home page on the Internet at http://www.maine.gov/ifw.

Regional Headquarters
(Game Wardens and Biologists)
Ashland -- 435-3231
Greenville -- 695-3756
Gray -- 657-2345

Additional WMS Regional Offices
(Biologists)
Sidney -- 547-5300
Enfield -- 732-4132
Jonesboro -- 434-5927
Strong -- 778-3324

WRAS Species Specialist Office
Bangor -- 941-4440

If you cannot locate a Warden at the above numbers, contact the nearest State Police barracks:

State Police Toll-free Numbers
Augusta 1-800-452-4664 / Houlton 1-800-924-2261
Orono 1-800-432-7381 / Gray 1-800-228-0857
Cellular Calls - 911

CONSERVATION PLATES DO GREAT THINGS

Support Maine's State Parks and Endangered Wildlife!
Register your car or truck with Conservation License Plates.

Do a great thing for Maine today!

Conservation License Plate funds are administered by the Department of Conservation and the Department of Inland Fisheries and Wildlife